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THE IMPACT OF ARMS TECHNOLOGY ON MILITARY DOCTRINES

Pertti Salminen

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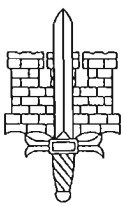

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1 WHAT IS MILITARY DOCTRINE?

It would be difficult to define the concept of military doctrine to the satisfaction of all readers. Its content and meaning vary from one country to another, and no two analysts define it in exactly the same way. This article examines how technological developments in weapons systems have influenced the military doctrines of three very different entities – superpowers, The Warsaw Pact and NATO alliances and neutral countries. In the absence of a common consensus, the concept of military doctrine is usually defined quite generally. For the purposes of this article, it is taken to mean those secret, declared or otherwise public or simply well-established strategic, operational and tactical policies that a state or an alliance employs in achieving its strategic goals. The most common such goal is to ensure the security of the nation and its citizens.

The American analyst Barry R. Posen maintains that, in examining a state's military doctrine, one should look at how the tools for meeting political and military goals are chosen and used. The nature of the action will depend primarily on the perceived strength of the opponent.

Military doctrines can be classified as offensive, defensive or deterrent in nature. The Blitzkrieg doctrine, developed by the Germans in the 1930s, is an example of an offensive policy directly related to power political aspirations.[1] Attempts to achieve widespread territorial hegemony through armed invasion are still being made in the Persian Gulf (e.g. Iraq) and the Middle-East in general. If we exclude the invasion of Croatia by Serbian troops in 1991–92, such policy has largely been abandoned in Europe. Since the Second World War purely offensive doctrines have become rare on the strategic level. Operational plans for different theatres of operation and the employment of troops may still contain an offensive element, however.

The idea of employing defensive military force to guarantee the security of a country or an alliance has become widely accepted. The Great Wall of China and the Maginot Line are

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Major GSO Pertti Salminen is an Instructor for Research and has earlier taught strategy and tactics at the War College.

expressions of traditional defensive doctrines. Since World War II, such inflexible defensive models have, however, been replaced by models that call for a deeper, territorially more flexible use of forces. Almost inevitably, defensive policy assumes offensive (counter-offensive) features as well. The defence doctrines of neutral states and the mobile defence of some NATO troops in Germany express this tendency.[2]

In recent decades, the idea of deterring an opponent from attacking out of fear that his losses would be unacceptably high has become the main basis for strategic doctrines. Military power is developed and maintained in order to prevent wars. Absolute deterrence refers to the ability of a country or an alliance to carry out a retaliative strike that the aggressor cannot withstand. The Soviet and U.S. doctrines regarding the use of nuclear weapons were both predicated on this principle of absolute deterrence. Countries with only limited military resources attempt to stay out of conflicts by maintaining a policy of relative deterrence. Europe's neutral states have adopted this policy. The idea is to be able to inflict on the aggressor unacceptable damage, so that it is more advantageous for it not to engage the defender. A strategic doctrine based on deterrence can, operationally or tactically, be either offensive or defensive.

There are various levels of doctrines. Those that concern the employment of the entire military capability of a country or an alliance can be labelled strategic. In the post World War II period the strategic doctrines of the superpowers have been based on nuclear deterrence. Strategic defence policies of neutral states usually rely on the ability of conventional forces to act as a deterrent, whereby an adequate attack threshold is maintained.

Doctrines at operational and tactical levels indicate how warfare should be waged to meet the various goals of strategy. These battle doctrines describe the actions of corps, divisions and smaller units, the types of operations to be conducted, the kinds of troops to be employed and in what manner.

The Swedish researcher Wilhelm Agrell classifies doctrines into three categories: secret, declared or otherwise public, and ones that have become established through common practice.[3] Although the classification originates from a study describing the Swedish defence policy, it appears to hold more generally as well.

Secret doctrines embody the real principles for the use of force in a time of crisis. Mobilization and operational plans are almost always secret.

Public doctrines describe those aspects of a state's or an alliance's behaviour in crisis that are not perceived to jeopardize its security. Public doctrines often provide the basis for the state's deterrence policy. The usual purpose of a declared doctrine is to emphasize the intention of the author. Austrian's announcement of neutrality, or that of any other neutral country, stating that it will not allow its territory to be used against third parties, can be classified as a declared doctrine.

Sometimes a false yet feasible policy is declared in order to conceal real policy and mislead the opponent. Small states can only do this at an operations and tactical level, but the superpowers, with their enormous resources, are able to exercise this option at the strategic level as well.

A common practice may evolve into official policy, as when war experiences shape the policies of nation states. It can be assumed, for example, that the experiences of the United States in the Gulf War will reinforce certain aspects of its policy. Thus, the practice of setting up an information pool in times of crisis is expected to become official U.S. policy. Likewise changes in arms production projects will have an impact on policies regarding the use of force.

Doctrines become public knowledge in different ways. Secret doctrines may leak out through negotiations, careless comments or intelligence gathering. Declared policies are often disclosed in speeches or documents that are published solely for this purpose. Typically these describe the author's assessments of the world situation, perceived threats, and how to respond to the challenges in a way that promotes national interests. Public sources for doctrines include official documents and departmental directives, national budgets, documents pertaining to arms procurement, arms production statistics, and documents regarding the training, armaments, organization and location of troops.[4]

International seminars, such as the Vienna Seminar on Military Doctrine held in conjunction with the Conference on Security and Co-operation in Europe (CSCE), have, to some extent, made the formulation of doctrines more uniform. However, states tend to interpret their texts to suit their own national interests, so

that published doctrines are still not directly comparable. The tendency is there, nevertheless, and uniformity, especially in the case of strategic doctrines, can be expected to increase in the future.

2 FACTORS SHAPING MILITARY DOCTRINE

The factors that shape doctrines have been analysed by many experts in different circumstances. Samuel P. Huntington lists the following as determinants of military doctrines:

- the degree of parity of the opponents
- the composition of each opponent's armed forces
- the support and opinions of their allies
- public opinion
- the sensibleness of deterrence
- economic factors
- historical factors
- war experiences, both one's own and others'
- the terrain
- the perceived threat
- popular opinion in an occupied territory[5]

In his 1982 article, Christopher N. Donnelly, a Soviet expert at the Royal British Military Academy, cites ideology, the prevailing situation, history and technology as factors influencing Soviet military doctrine.[6]

Although Huntington's and Donnelly's lists are parallel and include the fundamental factors, they are not exhaustive. Posen[7] argues that doctrines are shaped by bureaucratic, power political, technological and geographic factors. The relative importance of the first two declined as political and military environments stabilized after World War II and it is still too early to assess the consequences of the instability of the past two years.

In the model employed in this work, which is a slight modification of Posen's, geographic, political, economic and other resource, and military factors are considered to be the primary determinants of military doctrine. The model[8] is presented in figure 1.

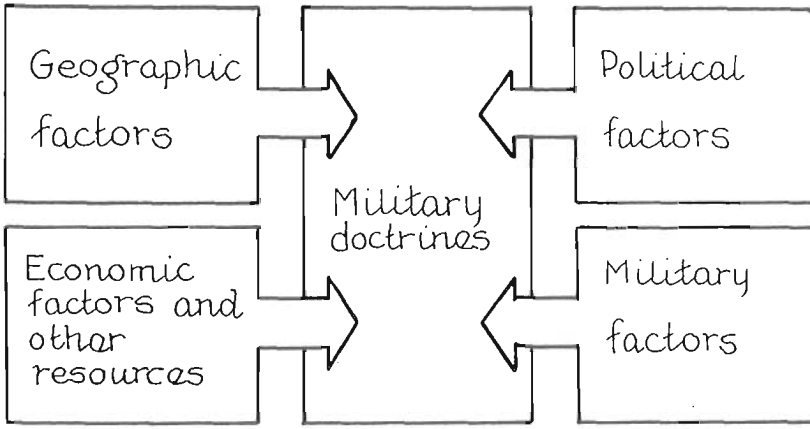

Figure 1: Factors influencing military doctrines

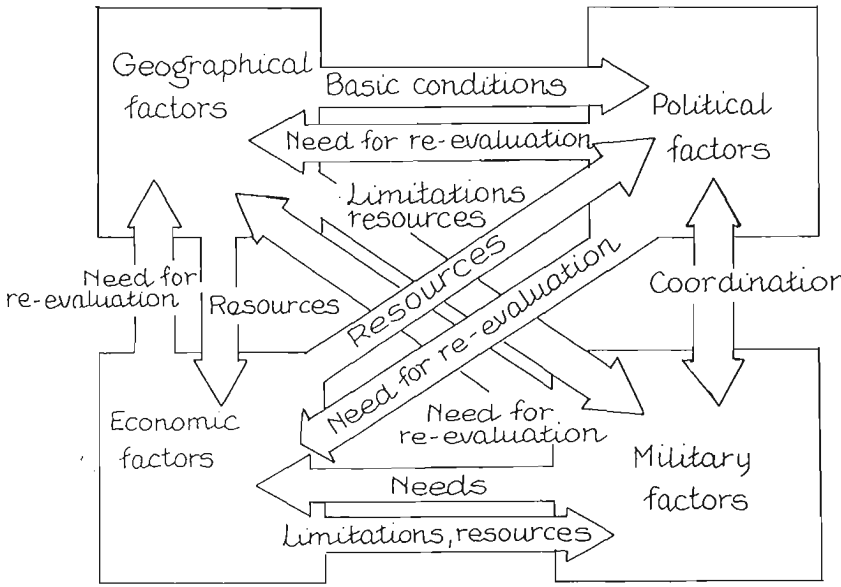

Figure 2: Interrelationship of factors influencing military doctrines (examples)

Although the model is highly simplified, it offers a good starting point for comprehensive analysis. As shown in figure 2, the four sets of factors in figure 1 are, in fact, closely interrelated. For example, geographic factors furnish a basis for political, economic and military activities. Political developments influence military and economic decision-making and may contribute to a re-evaluation of geographic factors. Military matters, in turn, are a part of foreign policy and influence economic decisions. Recurring military threats require a continuing evaluation and re-evaluation of geographic determinants. Concentration of economic activity into a particular location changes the geographic significance of that area and sets constraints on political and military action. The relationship between military doctrines and the factors that shape them is also a reciprocal one. Although technological planning will already be under way when doctrines are being formulated, policies, once selected, provide the arms industry and military organizations with a guide to future developments. A realistic military doctrine guides foreign policy-making in times of crisis and works to direct resources towards a realization of the specific goals.

A detailed analysis based on the model of figure 1[9] suggests that the geographic factors shaping doctrine of a country or alliance are

- location
- size
- shape
- infrastructure
- physical features, watercourses, natural barriers
- distances (as related to the above factors)
- climate
- amount of daylight
- type of soil and
- vegetation.[10]

The corresponding list of political factors includes

- quality and nature of the prevailing political system
- chosen political goals
- world view of those formulating doctrine
- prevailing political environment
- political history

- international agreements
- degree of political integration
- domestic political situation and
- public opinion.[11]

Economic and other resource determinants of military doctrine are more or less the same as the factors giving rise to national prosperity in general. These include

- raw material and energy resources, to the degree that they are exploitable
- structure, condition and productivity of the economy
- transportation and communication infrastructure
- level of research and innovation
- general technological level
- distribution of costs and economic resources and
- size and structure of the population.[12]

The military factors comprise

- war experiences and military tradition
- military threat
- former doctrines
- quality of the military leadership
- military technology and
- available military force and its organization.[13]

If nothing else, the above lists demonstrate that a multiplicity of factors shape doctrines. The large number of determinants becomes indeed cumbrous when the impact of arms technology on doctrines is singled out for study. Proper evaluation of the impact requires that one examine each feature of arms technology in relation to a specific change in doctrine, at the same time bearing in mind those other factors (figure 1) that may modify the effect. One must consider how the effect of new arms technology has been or will be modified in response to the influence of each geographic, political, economic and other resource, and military determinant. The relationship is illustrated schematically in figure 3.

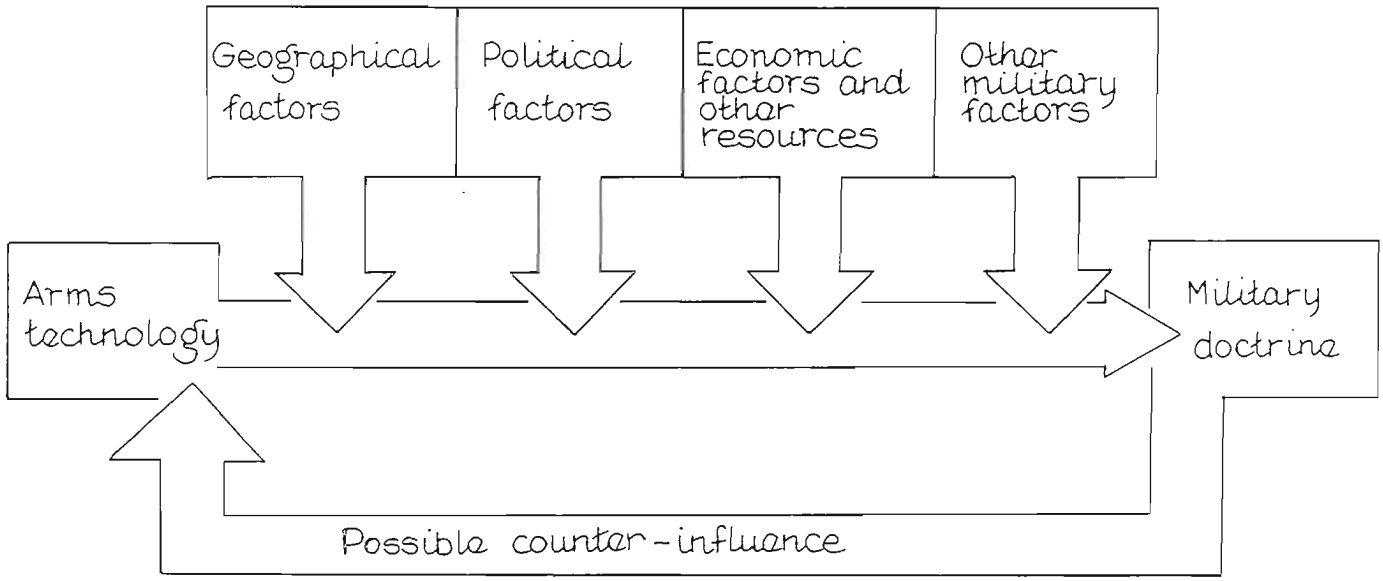

Figure 3: Conceptual framework of the study

Improvements in military technology depend upon doctrine and upon technological innovation, but the relative weight of the two factors would be difficult to determine. Doctrine, in turn, is shaped by three different categories of arms technology: (1) strategic nuclear and strategic defence armaments, (2) mass destruction and conventional armaments on the operations and tactical level and (3) supporting command, control, communications, intelligence (C^3I) and electronic warfare systems. A possible fourth category, which will not be discussed in this paper, is particle beam and laser weapons and technology aimed at controlling the various regions of the electromagnetic spectrum.

Though achieved to some extent at arms control and disarmament negotiations, a sharp separation of the different categories of armaments is not really possible. All nuclear arms are strategic in the sense that they form a path of escalation from tactical level to increasingly long-range and destructive systems. Owing to their range and effectiveness ballistic missiles equipped with modern conventional warheads must sometimes be classified as strategic weapons. The operations of the superpowers' conventional forces are a part of global grand strategy. The effects of biological weapons could spread to a very wide area with consequences of strategic magnitude. Although not absolute, therefore, the above classification is nevertheless useful as a means of simplifying the analysis.

3 STRATEGIC LEVEL

3.1 The evolution and ramifications of nuclear arms technology

Nuclear balance has traditionally been measured by a triad consisting of the total number of Intercontinental Ballistic Missiles (ICBMs), Sea Launched Ballistic Missiles (SLBMs) and strategic bombers. The advent of cruise missiles required a modification to the triad. Nuclear parity, achieved by the eastern and western camps during the 1960s, did not require that the numbers balance in all three sectors. It was enough that the totals were equivalent. More recently, analysts have moved away from the alliance-based triad towards a model that describes the central balance between the two superpowers.

Since the start of the disarmament negotiations, nuclear weapons have been divided into three groups: short-, medium- and long-range. Alternatively they can be classified as tactical, intermediate and strategic. Technological advances during the 1980s now make it possible for the superpowers to carry out a nuclear strike almost anywhere in the world.

The effectiveness and range of nuclear weapons has improved through increase in the number of warheads and improved penetration, accuracy and electronic protection of the missiles. The greater number of warheads and the ability to point them at different targets now provide a multiple strike capacity. Multiple warheads and reduced detectability of missiles have made defence against a nuclear strike more difficult.

ICBMs are vulnerable and require protective measures such as hardening of silos, mobility of launching platforms and installation of missiles in submarines where they are hard to detect. These steps in turn have led to an increase in the second strike capability, and thereby a higher employment threshold and greater deterrent value for nuclear arms. The development of the cruise missile allows greater accuracy in hitting targets in the intermediate and short range.

In the development of strategic bombers the emphasis has been on improving the weaponry, mainly the cruise missile, and

the ability to penetrate the opponent's defences. As well, the lifespan of older aircraft has been extended by equipping them with cruise missiles. Stealth technology has opened the way to bombers that are virtually invisible to radar. As a result, the role of the air force in strategic nuclear doctrine remains strong.

Development at the operations and tactical level has been similar to that of strategic nuclear weapons. The objective here has been to develop arms that cause as little collateral damage as possible so that the operations area can be utilized for one's own purposes in the next phase of battle. The neutron bomb is a classic example of these new weapons.

These developments in nuclear weapons make it possible to choose at will, according to the threat, the range, accuracy and effect of the retaliatory or pre-emptive strike. In the early Cold War period, nuclear deterrence was the primary factor shaping doctrines.

The development of Soviet nuclear and conventional arms technology in the early 1960s broke American confidence in the massive retaliation they thought guaranteed by their nuclear monopoly. Responding to the scenario of mutually assured destruction, the West developed a concept of flexible response according to which unlimited nuclear war should be avoided and the response to threat or aggression should be a controlled one. Even movement downward on the escalation ladder was thought to be possible.

As weapons improved, the strategies of massive retaliation and the broad targeting of urban areas yielded to an increasingly accurate pinpointing of targets. This trend can be seen in the constant reconstruction of target lists. Targets on Western lists included Soviet nuclear and conventional forces, military-political headquarters and economic-industrial areas. In principle, the categorization of targets was intended to allow a selective, limited or general use of weapons according to assessment of the regional, military and political situation. The Soviet Union also had a target list but its contents are not well known.

In American doctrine, nuclear weapons would be resorted to only when all other options had been exhausted. First use was not ruled out if the situation warranted. NATO policy, which was dependent on the U.S. nuclear umbrella, was similar in content. Up until the 1980s, the improvements in Soviet arms

technology and Soviet mass production were considered to underscore the importance of a first strike. Europeans, too, clung to the belief that the new weapons would make possible a first strike, but one justly proportioned so as to allow controlled escalation, resulting in only limited nuclear war.

With the NATO decision to deploy intermediate-range nuclear arms in Europe in the early 1980s the West filled out its arsenal to cover all ranges, as was called for in Western doctrine. Simultaneously, the Soviet Union achieved approximately the same status by deploying its SS-20 missiles. Other factors affecting doctrine were assuming importance, however, and eventually these would alter the entire significance of nuclear weapons.

Today, faith in the possibility of a limited nuclear war has all but dissipated, while the fear that crossing the nuclear threshold will inevitably lead to escalation and unlimited nuclear war has become more entrenched. Even the purpose of a gradual escalation is sometimes questioned. Once the nuclear threshold is crossed, it is argued, then why not move directly to the highest level?

With international agreements not providing for an adequate crisis-control mechanism and the public horrified by the prospect of nuclear war, political leaders moved to take action. Nuclear arms began to lose their credibility as useful weapons, and the idea strengthened that at least a part of them should be destroyed.

Economic factors entered the picture at the same time. The United States had challenged the Soviets to an arms race that drained its economy. The U.S. Strategic Defence Initiative (SDI) launched in 1983 may have represented the final, impossible challenge. The credibility of the communist ideology began to crumble both in the Soviet Union and in third world countries. As well, the damage to the environment caused by industry, especially the military industrial complex, turned into a politically explosive issue.

With the many new factors now at play, the final outcome may be entirely different from what was anticipated in the early 1980s. Although research and development of nuclear arms undoubtedly continues, the two superpowers appear ready to go a long way towards abandoning their weapons of mass destruction. Now that the Cold War has ended and its structures are slowly disappearing, the nuclear balance between the

superpowers is less significant than before. Nevertheless, it appears that nuclear arms will, at least for some time, remain in the world and in doctrines as a form of final guarantee against sudden changes in the thinking of the other side.

The latest indicator of the role of nuclear weapons is the changes in NATO strategy announced in November 1991.[14] Nuclear deterrence will remain as policy, partly as a counterbalance to the nuclear weaponry of the former Soviet Union, and partly as a precaution against problems that may arise in Eastern Europe. Russia will also maintain its nuclear deterrence, but other members of the Commonwealth of Independent States (CIS) have publicly declared that they will relinquish nuclear weapons, and so also give up the nuclear part of their military doctrines. In reality, the transportation and destruction of nuclear weapons will take time and it is conceivable that political and doctrinal thinking will change in the meantime. Contrary to the general trend, the French are taking steps to increase their national nuclear deterrence to a level that would cover the whole of Europe. The evident objective is to escape the dependence on the American nuclear umbrella.

3.2 *The proliferation of nuclear arms*

The concept of nuclear deterrence as a guarantor of national security enjoyed wide support during the Cold War. At least China, the United Kingdom and France achieved a level of know-how enabling them to manufacture nuclear weapons and create their own mini-deterrences. The Soviet Union, from time to time, has demanded that limitations under the strategic arms limitations negotiations should apply to the nuclear weapons of all countries, but none of these other countries have agreed to the Soviet demands. Nuclear arms have retained their place in doctrines despite the recent changes that have drastically reduced the threat of war in Europe. France, indeed, is reducing the number of her short-range missiles, but leaves the Germans wondering how, and against whom, France plans to use the remaining tactical weapons.

Nuclear arms technology has proliferated outside of the United States and Europe. In addition to China, altogether 13

countries are believed to possess or to be developing nuclear weapons.[15] It is reasonable to assume that nuclear deterrence forms part of the secret doctrines of these countries. Recent disclosures regarding Israel's nuclear capability, and that of Iraq and other Islamic countries, have prompted a re-evaluation of strategic thinking in the United States and Russia.

In their arguments for the alteration of existing and development of new missile defence systems the Great Powers note the possession of nuclear arms by several developing countries. While it is unlikely that their programmes are technically very advanced, their role in a North-South or comparable conflict is a matter of surmise, and accidental use is always a risk. One may therefore expect that, even though the superpowers cease to threaten each other with nuclear weapons, ballistic missile defence will remain, in diminished form, a part of the doctrines of the United States and the successor states of the Soviet Union, and it will probably become a part of the strategies of NATO and the larger European countries. A political level offer by the United States to help upgrade the Russian missile defences speaks for this argument.[16] The new NATO military strategy mentions missile defence, though the recent Rome Communique does not discuss when and how it will be implemented. It is known, moreover, that NATO countries have acquired and will continue to acquire the Patriot missiles which were battle tested in the Gulf War. The need for a missile defence system would appear to be intensified by the uncertainty over who will come to possess the Soviet nuclear arsenal, and over the political aspirations and military doctrines of the successor states.

3.3 The arming of space

The military use of space has grown together with its non-military use. Space is used militarily in at least four different ways. It provides the passage way for ballistic missiles. It is the location for the most important strategic intelligence, command, control and communication (C^3I) equipment. In the future, equipment used in the fight for control of the electromagnetic spectrum will be located there. And finally although the latest U.S. budget suggests otherwise, space-based weapons are still under

development.[17]

Military surveillance systems that operate outside the atmosphere have been in use since the 1950s. The imaging and measuring technology of satellite intelligence systems continues to improve. Satellites can now monitor the use of the entire electromagnetic spectrum over a broad geographic area. With radar and television systems even ocean areas can be monitored. Militarily, satellite systems allow observation of the movement, location and activity of enemy troops and equipment, facilitating earlier warnings and better defence readiness.

Space technology also improves the accuracy and effectiveness of weapons. Satellites help guide aircraft and missiles to their targets. SLBMs are now able to achieve the same accuracy as the best silo missiles. It is thought, for example, that Trident missiles could be used as effective first strike weapons even against the hardened silos of the former Soviet area.

Command and communication systems are developing in pace with reconnaissance and control systems. Space-based systems enable the superior command to command troops worldwide. During the Gulf conflict, the Pentagon was able to give immediate detailed descriptions of the battle situation. Naturally, only information that suited U.S. purposes was publicized. Thanks to advanced information processing techniques, to a large extent information gathering, compiling and analysis took place somewhere else than the battlefield. Analysed information was then transferred to the commander of the particular sector, who thus, too, benefitted from the space system. Much of the reconnaissance information from the commanders' own forces likewise was transmitted via satellite link.

The Strategic Defence Initiative (SDI) announced by the United States in 1983 touched off a mammoth programme of research and development into space-based missile defence systems. In addition to traditional defensive missiles, investigations were launched into beam, particle and kinetic technologies. Plans called for weapons to be installed both on earth and in space. In 1983, Marshall Nikolai Ogarkov announced the Soviet version of SDI in the Moscow daily *Isvestija*. Even Party Leader Mikhail Gorbachev promised early in his term that the Soviet Union would develop a response to the SDI in space,

on earth and in the air.

Even though strategic defence is a part of Great Power doctrine, weapons development plans have not gone forward as anticipated ten years ago, and neither existing nor potential space weaponry has influenced doctrines to any great extent. SDI was opposed in the early days because it was perceived to upset the existing nuclear balance and to guarantee the United States a first strike capability. Within the United States, some of the opposition was rooted in domestic politics and in disagreement over the allocation of resources.

The first U.S. space doctrine dates back to 1982. In the same year the space and missile organization of the Air Force was renamed the Space Command. The Navy received its own Space Command the following year. These developments by themselves were a sign of a significant shift in doctrine.[18]

It soon became clear that it was unnecessary to engage the Soviet Union in a race for the use of space as its economy was already collapsing. Since then the SDI has been modified - dreams have been replaced by realism, at least as far as timetables are concerned. The most recent indicator is the U.S. decision to employ only surface-based defensive missiles for the time being. Space-based missiles will not be deployed in the foreseeable future.

Space-based command, control, communication and intelligence systems have reinforced the defensive posture of doctrines. Moreover, the better overall picture of situations, and the better ability to command, facilitate a more flexible, versatile and expedient use of force while lessening risks. As manifested by certain new offensive aspects of present U.S and NATO doctrines, the ability to carry out an attack has improved as well. Both superpowers have improved their ability to intervene far away from their own territory. Owing to the long distances involved, both the American Rapid Deployment Forces (RDF) and Soviet airborne forces require highly advanced support systems.

The implications of space-based military technology are not readily studied. Although it may be easy to assess the declared doctrines and expenditures of the United States, the details of technological advance and the hidden agendas will scarcely be uncovered. Until recently, assessment has been even more difficult for the Soviet Union.

3.4 *The global use of conventional forces*

The use of force to protect their interests worldwide is an inherent part of the strategies of the Great Powers. The most recent examples are the Falklands War, the Panama Operation, the Gulf War and the French action in Africa. According to the United States, grand strategy securing national interests is predicated upon three central concepts: forward presence, power projection and reconstitution. In other words, ability to influence events in distant areas requires a presence in that area, a movement of forces into the area if necessary and a formation of back-up troops at home.

Continued presence and intervention require technological means with which to move the troops to the target area, ensure their operation and support their logistics needs. Three aspects require examination: command and support technology, transport technology and the transportability of systems.

A comprehensive C^3I system is essential when operating worldwide. Although many of the C^3I subsystems cannot be classified as weapons technology as such, the same technical innovations exploited in C^3I have been incorporated in weapons systems. Command, control, communication and intelligence are even more difficult to separate from weaponry when it comes to weapons use. Certainly one aspect of command, and in wartime the most important, is the effectiveness of weapons. An integrated C^3I system allows the use of sophisticated and far-reaching weapons to support troop operations in distant parts. Today's increasingly sophisticated reconnaissance aircraft, remotely piloted vehicles, electronic warfare systems and early warning aircraft, together with the space component, improve the command of troops and weapons systems in a major way.

The versatile support now offered by aircraft carriers is one of the most significant developments in global operations. In the past, the task of such carriers was merely to provide fire and air support to ground troops. New tasks include electronic warfare, helicopter or even transport aircraft support, precision guided weapons (e.g. cruise missiles) and the antitank capability provided by the improved weaponry of fighter aircraft.

Transportability of weapons systems by both sea and air has improved. The transport capacity particularly of the Great Powers

has expanded through the availability of larger aircraft with longer range. Parallel development of military and civilian aircraft means that the latter can be conscripted for military purposes: airlifts of large troop formations to distant locations have already taken place. The same aircraft can service troops and equipment through supply and evacuation flights. The utility of helicopters has improved through increase in their capacity, range and speed.

Opening of a battle front by troops transported by sea has become easier as a result of the development of landing and support vessels, amphibious and semi-amphibious reconnaissance vehicles, hovercraft, armoured fighting vehicles and main battle tanks. Improvements in amphibious equipment enable the unloading of landing forces far from the shore.

The weapons technology of transportable troops has undergone dramatic change. Armoured vehicles have become lighter and their firepower has increased. Similar developments in ammunition have further improved transportability. Lightweight yet effective missile systems mean that infantry can bring their own antitank and anti-aircraft weapons to the battlefield. Troops also possess adequate electronic warfare equipment for opening of the battlefront, allowing the operation and command of their weapons systems to be immediately secured.

Interventions have long been a component of Great Power doctrines. In the past, geographic factors have been a major obstacle to their execution. Now, the technology described above enables Great Powers to influence events anywhere in the world. The U.S. Rapid Deployment Forces were originally created to secure American strategic interests in the Middle East and Africa. The concept of power projection, or at least the crisis response aspect of it, can be viewed as an interventionist component of U.S. strategic doctrines. A similar interventionist policy was a part of Soviet doctrine, with its ideological commitment to defend socialist interests. The aircraft of certain Soviet airborne units, for example, have sufficient payload capacity to drop heavy equipment, including ordnance and armoured vehicles. New technology has thus made it possible for the Great Powers to intervene around the world without having to depend on fixed bases. In the recent Gulf crisis, only 8% of the total materials used by the U.S. and its allies were pre-stored in the area and some of

that 8% was stored on board ships.[19]

New technology has made possible the U.S. Navy's Over The Horizon (OTH) doctrine, which provides the framework for the Navy, entirely on its own, to open a battlefront after sea transit. OTH was designed to allow quick response to threats directed at the United States or its allies. In case of a larger conflict in a bipolar world, OTH would have offered the alternative of horizontal escalation, for example into Asia, if the European situation so required. In the new strategic thinking, OTH is an adjunct to Low Intensity Conflict (LIC) doctrine, which provides for getting involved in critical areas early in the crisis.

LIC doctrine is also invocable in the fight against illicit drug trade, terrorism, even organized crime. In this case OTH and airborne Special Operations could be supported by faster moving and better equipped Special Operation Forces in order to control the threat. The new arms technology in general has made it easier to employ special forces in tasks all over the world.

NATO's new military strategy emphasizes multinationality and constant readiness of forces in the protection of member nations against crisis. As this, in many cases, involves moving troops to sectors far away from their home base, the transportability of troops and weapons becomes critically important. The planned composition of NATO's Rapid Reaction Corps[20] seems to require, for example, that Holland form airborne forces and Denmark transport troops to the south of France. This change in doctrine has more to do with political considerations than technological factors. Underpinning the new strategy, nevertheless, is the fact that new arms technology increases the mobility and flexibility of troops so that even the troops of small nations are "within reach". Multinational operations require a harmonizing of troops and standardizing of weaponry. The end result will be a growing commitment to similar weapons systems and increasingly unified doctrines within the NATO camp.

4 THEATRE-LEVEL OPERATIONS

4.1 The evolution of Soviet military doctrine

The Soviet military doctrine was comprehensive in the sense that it identified the likely opponent, the nature of the conflict, the military objectives and the functions of the armed forces. It provided guidelines for the development of specific branches, specified the urgency of preparations, and indicated the methods of waging war by prescribing strategy, operations and tactics. Conversely, as components of military science, these factors shaped the development of overall policy. Minor changes did not, however, necessitate altering of such a broad-based and universal doctrine.[21]

The battle principles of Soviet military doctrine were offense, the element of surprise, concentration of overwhelming forces at critical points, massive use of troops and firepower, operations in the opponent's rear, and secret and covert operations involving ABC weapons.[22] Battle principles were heavily influenced by World War II experiences, while responding to changes in political goals and to technological innovation.[23]

The Soviet view of future war was formed from conclusions about advances in their own and enemy military technology. Battle, it was thought, would be short and fierce since, in the Soviet perspective, all military conflicts between East and West would irrevocably escalate into a general nuclear war. As in the U.S., new technology in all fields of weaponry swelled the number of types of warfare in the Soviet strategy during the 1980s.[24]

Doctrines of the Warsaw Pact countries followed the Soviet lead as the impact of the new arms technology was felt through Soviet doctrinal development. Although the member nation forces differed in composition as the result of an internal division of tasks, there would be little point in examining each state separately, since the conclusions would be similar to those drawn from an analysis of the Soviet case.

4.2 *The final years of Soviet battle doctrine*

In its final years, Soviet operational and tactical battle doctrine was based on operational and tactical principles laid out in the general military doctrine. The main battle practice was to be an echeloned attack in which waves of troops followed one another, asserting continuous pressure on the defender. No lull should be allowed in the battle during which the defender could recover and regroup. Once the defence broke, second and third echelons of attack would be directed at the opponent's vital areas. The doctrine assumed the use of armoured mobile groups whose task would be to penetrate deep into the opponent's rear, to cut communication lines and destroy enveloped enemy troops. Earlier the targets of the mobile group had been fairly close to the front.

During the 1980s, many Western observers came to believe that the Soviet organization, division of the theatre of operations, command system and battle doctrine were undergoing a transformation. A new emphasis on mobility, cooperation between different services and branches, and an increased use of special forces suggested a move towards more offensive and deeper striking "Blitzkrieg"-type operations, intended to turn the tactical successes of earlier mobile groups into operational or even strategic successes. The end result would be a doctrine allowing for all contingencies, including the use of weapons of mass destruction. The doctrine would be more flexible than before and provide for the use of many types of warfare. Although Western assessments did not rest on hard evidence, they did suggest more or less accurately, how new arms technology was influencing doctrinal development within the Warsaw Pact alliance. The Soviet military-industrial complex also continued to turn out fairly sophisticated weaponry for the massive forces required in a decisive strike. The recent partial opening of archives has confirmed the Western assessment of the Soviet threat to be broadly correct.

Putting evidence from various sources together, Western analysts came to postulate the existence of a new formation, which they called the Operational Manoeuver Group (OMG).[25] At the level of a front the OMG would perhaps be made up of elite tank units. In an army the OMG might have consisted of a tank or a motorized infantry division, supplemented with

helicopters and combined arms troops equipped with the latest weapons technology. Support would have been provided by a substantial tactical air strike capability. Such a "supergroup" would have operated more or less independently, although under the direction of the army commander. Its task would have been to penetrate deep inside the enemy territory, to destroy crucial military objectives during the all important early days of the battle. Penetration would take place through an opening created by the first wave, or else the OMG itself would break through a weak point in the defence. The primary objective of the OMGs, Western analysts surmised, was to prevent the opponent from maintaining an organized defence along a contiguous front. Activities in the opponent's rear would concentrate on destroying launching pads and storage facilities for nuclear weapons, important control, command and communications centres, lines of transportation and service depots. Support to the rear would be provided by special forces and aerial operations.

It has been suggested that the creation of the OMG was influenced by technological innovations in both East and West. NATO weaponry had begun to threaten the viability of the traditional attack doctrine. Tactical nuclear weapons, air force, helicopters, rocket launchers, remotely delivered mines and other aerial weapons were all perceived as new and major threats by the Warsaw Pact.

Earlier Soviet doctrine had assumed the formation of distinct fronts. The opposing forces would remain apart until a mobile group had advanced behind the defender's lines. So long as the fronts were separated, NATO would be able to use tactical nuclear weapons against the Warsaw Pact troops; but the penetration of an OMG deep amongst NATO forces, it was thought, would prevent a nuclear retaliation around the immediate battlefield. The continuing nuclear threat to the rear of the Warsaw Pact forces left no other choice but their dispersal over a broad area. Some observers believed that the OMG would be made up of the appropriate forces only just prior to battle. It was thought that the Warsaw Pact was moving towards the use of balanced divisional formations, to which armoured and motorized forces could be attached as necessary.

The continued motorization of forces and especially the massive use of relatively modern tanks improved the possibilities

for dispersion and rapid penetration. Even if seizing of the initiative failed and NATO, being weaker in conventional forces, resorted to nuclear weapons, some Warsaw Pact tanks would retain their ability to function thanks to ABC protection. Forces would be able to advance through and perhaps even fight in the contaminated areas. Possibly the Soviets would have used their own nuclear weapons to ensure success. NATO missile launching pads and storage facilities would perhaps have become prime targets for the OMG's various sabotage and commando groups.

The increased threat that NATO air forces posed to advancing troops and their service lines led to changes in the organization of the air force and in Soviet air defences. Evidently the air force had earlier been entirely under the command of the front commander and his superiors. During the 1980s, howeverwever, parts of it were placed under the army commander to ensure that the OMG would receive adequate fighter cover and direct and continuous fire support. Such a change would allow better coordination between troop movements and air cover. The new tactical aircraft and helicopters would improve the operation of the OMG. Moreover, how more independent of central fire command, the more mobile and better protected air defence troops would be able to keep pace with the fast moving units, providing them with better protection.

NATO's air defence, upgraded by new aircraft and surface-to-air missiles, forced change in the operational principles of the Warsaw Pact air forces. Western defences became targets for specific aerial operations. The battle against NATO air defences also appears to have increased the importance of air-transported and other special forces that operate behind enemy lines. All offensive aerial operations, involving aircraft, missiles and airmobile forces, were to be carried out either independently or in close cooperation with ground troops. Conventional, chemical or nuclear warheads would be targeted at air fields and major weapons systems. At the same time, emphasis was put on improving the air defences of the Warsaw Pact's own main bases.

NATO's new assault aircraft and antitank helicopters increased the vulnerability of Warsaw Pact air defences. Western analysts believed that, as a result, a portion of the air defence responsibility was to be transferred to counter air helicopters. Technological advances in Warsaw Pact air forces allowed better

fire support to ground troops and enabled this to be delivered quickly to areas beyond the reach of artillery weapons. About half of the OMGs' fire support would come from the air. Helicopters would be responsible for protecting the friendly rear and flanks. Transport helicopters would increase the number of landings in enemy territory, and combat helicopters and tactical aircraft would provide fire support for airmobile operations. The role of helicopters and tactical aircraft was increased in the new doctrine as these were to begin operations deep inside the enemy territory simultaneously with the main attack.

The whole concept of the OMG assumes a situation in which tanks continue to have an advantage over antitank weapons. Although NATO's deployment of modern antitank technology, albeit slowed by the high cost, should have reversed the situation, giving the defender a definite edge, NATO's inability to mobilize quickly would not have allowed even its improved antitank units to be deployed fast enough to repel an attack by a peacetime-strength OMG, let alone one of wartime strength. In the final analysis, however, the nuclear threat and NATO's defence capability would seem to have persuaded the Warsaw Pact to abandon the idea of conquering the whole of Western Europe. Evidently, it was content with limited goals that would provide room for political manoeuvring.

Obstacles such as NATO remotely delivered mines would have slowed the OMG offensive at a crucial moment. To reduce the threat, the delivery systems should be attacked. In addition to air defence operations, it was important to prevent the firing of missiles and artillery carrying mines. Launching pads and fire positions could be attacked with counter-artillery. Artillery missiles would be suitable for long-range operations and the immediate support of mobile groups, while self-propelled artillery could be used against shorter-range antitank weapons. Tactical aircraft and indirect artillery fire would look after mortars and rocket launchers.

The use of OMGs could only succeed if the activities of all branches of arms were coordinated in the attack area. Self-propelled artillery with increased range improved fire support. Even as regards fire delivery, the OMG could be scattered at the staging area. Direct fire capability increased the protection against enemy tanks, and in some circumstances allowed the use of

indirect fire against enemy tanks in accordance with the forward leaning principle included in earlier battle doctrine. A more mobile, far-reaching and independent anti-air defence removed the restrictions that an earlier vulnerability had put on fast-moving ground troops. New mine-clearing techniques and the possibility of circumvention through the use of transport helicopters contributed to a speedy forward push and reduced the significance of terrain obstacles. The need for rapid logistics support increased. The armouring of vital service vehicles, along with the protection provided by other branches, improved the ability to service troops in hard to reach places deep in the opponent's rear. Helicopter transport became increasingly important. Combined-arms operations led to changes in command practices: rigidity was replaced by flexible and innovative command methods.

Battle capability in the opponent's rear was improved by equipping armoured fighting vehicles and main battle tanks with antitank missiles. Portable and vehicle-mounted missiles required fire position preparation, which meant that they were useful only in protecting OMG flanks and lines of communication.

Special forces and sabotage groups evidently were significant in the new doctrine. Lightweight personal battle gear, portable antitank and anti-aircraft systems, along with other weaponry now increasingly air transportable, improved the capability to operate in difficult conditions deep inside enemy territory. The new weapons systems positioned in the enemy rear intensified the need for special forces. Special purpose forces were useful for pinpointing targets for long-range missiles and the air force.

The new technology fundamentally improved the Soviet capability to carry out a surprise attack. Mobility, the ability of combined arms to keep up, the ability to achieve air superiority along the axes of advance, the availability of fire support and sophisticated darkness and all-weather capabilities lessened the dependence on favourable weather or lighting conditions. Working to the same effect was the simultaneous activity over a wide area in the opponent's rear. The Soviet Union modernized its European forces and concentrated its newest technology and strongest units at the Central Front in the German Democratic Republic and Poland. One can conclude that offensiveness and an element of surprise were key concepts of Soviet battle doctrine

prior to the breakdown in Europe. Improvements in Western surveillance, early warning and command systems to some degree decreased the Soviet ability to conceal its activities and, by the same token, weakened the element of surprise.

Concentration of overwhelming forces in the decisive sector and massive use of firepower remained in the Soviet doctrine despite the new need to scatter troops. Concentration was made possible by improved mobility and the effectiveness and correct timing of aerial fire support. The closer cooperation between battle and support forces meant that one could talk about the operations of combined arms.

4.3 *The concept of sufficient defence*

Faced with economic and ideological collapse the Soviet Union was forced to alter its foreign policy and agree gradually to withdraw its troops from Eastern Europe and the newly independent Baltic countries. It has many times been observed by analysts that earlier Soviet military doctrine has now been replaced by a new defensive doctrine of sensible sufficiency. Besides the withdrawal of troops, the new foreign policy is evident in progress in arms control and disarmament negotiations, unilateral reductions of nuclear arms, withdrawal from Afghanistan, discontinued military assistance to developing countries and announcements regarding troop reductions and reductions in the military-industrial complex.

The change in Russian foreign policy doctrine is clear. And it is equally clear that economic factors have been the major catalyst for change. The chances of the Commonwealth of Independent States formulating a joint military doctrine are minimal. At best it may be able to reach some kind of an agreement with regards to nuclear weapons and, even then, possibly only in terms of arms reductions. In January of 1992, German Chancellor Helmut Kohl argued, in disagreement with the above, that economic aid to CIS should be delayed in view of the unfavourable new military doctrine being formulated.[26]

As chief successor to the Soviet Union, Russia is likely to develop not only a new grand strategy but a new battle doctrine as well. At least in public declarations this is likely to be defensive

in nature. It will, however, have to take into account the tremendous size of the Russian territory and its numerous security interests in many directions. These factors, by their very nature, put a premium on mobility and offensiveness.

Russia also inherits most of former Soviet weaponry and a defence industry that, while undergoing conversion, continues to produce modern, and even new weapons. The radical cuts in arms procurement announced in early 1992[27] will not cause conventional weapons to become outdated until about ten years from now. It is worth noting that, generally speaking, the East lags about ten years behind the West in technology. In some areas it is not even possible for the East to develop weapons systems that correspond to Western systems; in others, as in the field of conventional electronic warfare, however, they are sometimes ahead of the West. This type of assessment depends, of course, upon the perceived opponent: Russia will retain a superiority in weaponry relative to the parts of the former Soviet Union and to China, even while her position relative to the West declines.

Although weapons designed for offence can also be used defensively, this is not the most effective and optimal way of using modern systems. If the production of new weapons is drastically reduced, Russia will not be able to match the versatility, range, accuracy and effectiveness of Western artillery and missiles. She will also have to take into account the possibility of conflict not only with the West but with former Soviet republics equally equipped with herself. As a result, Russia is likely to maintain a certain degree of offensiveness in her battle doctrine. Supporting this conclusion in her move towards a massive and effective employment of existing systems. The new doctrine might be called mobile defence. The inevitable aging of weaponry puts added importance on innovation, and indeed, this resource is now being tapped as the demands of rigid ideology and an inflexible central command collapse.

In addition to arms technology, the strategic-level political developments mentioned above influence battle doctrines. The treaty on Conventional Forces in Europe (CFE), with its verification procedures, reduces the likehood of a surprise attack, but does not render it, nor the launching of a massive assault, impossible. Certainly neither the present nor the future leadership

of the former Soviet territory is likely to envision a conquest of Europe, or even a part of it. An attack could nevertheless occur, through escalation from some internal squabble among the successor states of the Soviet Union, some dispute over earlier territorial arrangements or, in the worst case, an attempt to compensate for damaged Russian national pride. Relative to earlier times, however, the threat from the East is considerably less daunting.

4.4 The United States AirLand Battle

The AirLand Battle (ALB) doctrine of the United States army became public knowledge on 20 August 1982 when it was published in the army field manual.[28] Unlike the earlier doctrine announced in 1976, the new version stressed offensiveness, defeating the opponent and winning the battle. The manual noted that the battlefield had changed, as a direct result of the new Warsaw Pact military technology. The main goal for the Americans was thus to counter the threat posed by the advances in enemy technology. This was to be accomplished by using their own technology and forces in a counter-offensive way, especially during the initial phases of the conflict. Comparing the new and earlier doctrines one is immediately struck by the new emphasis on air power. Moreover, although nuclear and chemical weapons received more attention than in 1976, the main thrust was towards utilizing conventional arms technology as far as possible. The most recent developments of the doctrine can be found in the 1986 edition which includes, among other things, a discussion about managing low intensity conflicts. The experiences of the Gulf War are likely to bring about further adjustments to the doctrine in the near future.

The underlying principles of ALB are initiative, mobility, combined-arms operations and, most importantly, deep strikes into enemy territory. Hitting the enemy rear and especially his supply lines is considered crucial. The objective is to weaken the invader's second and subsequent echelons and prevent them from joining the decisive battle. In the present situation, where the potential aggressor does not necessarily act in the echeloned manner distinctive of Warsaw Pact doctrine, the emphasis changes

to cutting off the chosen battle area from enemy influences.

The technological advances within the Warsaw Pact meant that the U.S. army should be prepared to fight against light, well-equipped troops. Particular note was taken of the Pact's special forces, terrorist groups and mechanized units. With the improved mobility of the opponent and the possibility of breakthroughs, formation of solid fronts was no longer considered feasible. The range and destructiveness of the opponent's land and air weapons, which matched or sometimes even exceeded those of the U.S., would allow the opponent to operate deep inside NATO territory. Securing these rear areas became important as the opponent increased the use of well-armed air and amphibiously transported troops.

Successful operation on a battlefield deep inside enemy territory primarily depends on the increased firepower of air force and artillery. Although U.S. long-range weapons do not exist in great numbers, they are well suited for this task provided targets are selected with due care. New electronic and target acquisition systems assist in targeting the weapons.[29]

Also well suited to fighting deep inside the opponent's territory are conventional and special forces equipped with the new weapons. The use of mobile forces to seize the initiative has become a more realistic option as weapons systems have become easier to transport and transport planes larger. The opportunities to penetrate the opponent's ranks on land have improved as a result of the greater mobility, protection and firepower of army weapons systems and the organizational improvements brought about by the Army 86 and other modernization programmes.

Improved mobility of the friendly infantry has placed new demands on fire support and increased the need for combined-arms operations. Technological developments in artillery and air defences have made possible continuous fire support even for troops far away from the fire positions. Fire support for ground forces has further been enhanced by the development of combat helicopters and tactical aircraft. Because this support does not rely on ground connections, it can greatly assist the battle of airborne forces in difficult terrain.

Antitank activity has become a task for almost all branches, which are thereby better equipped to support one another. Enemy supply lines can be struck by aircraft- and helicopter-delivered

mines, while closer to the front, the mine-delivery capability of the artillery can be utilized. The increase in the number of antitank missiles improves close-range defences. For their part, helicopters and other advances in air forces increase the mobility and flexibility of antitank defences in accordance with the demands of the battlefield and battle doctrine. Tactical and intermediate-range nuclear and conventional missiles can be used to strike distant fixed installations and forces. Thus deep attacks can be carried out without involving friendly ground troops at all. The credibility of ALB is improved by the precision and areal effect of antitank weapons whose various ranges provide flexible support for deep strikes. The 1982 army manual mentions long-range weapons but without providing a full listing. The 1982 doctrine assumed that battles would be fought with the new technology expected to emerge during the decade.

It was believed in 1982 that the development of tactical nuclear weapons would alter the traditional balance between fire and movement. Nuclear weapons could clear the way for fast moving forces and stop the opponent deep in its rear. The army manual repeatedly emphasized preparedness to fight in areas contaminated by nuclear and chemical weapons and did not preclude a first strike.

AirLand Battle 2000[30] is a modified and expanded version of ALB, which seeks to take account of the new arms technology with its space-based components. Adoption of this doctrine would signal a final step in the evolution of the battlefield into a composite of technological systems. The end objective is to replace nuclear weapons with an entirely new technology capable of nearly the same results. The proposal is targeted at the future - the year 2000 at the earliest. During the past few years, AirLand Battle 2000 has further evolved into AirLand Battle Future, or – the most recent title – Air Land Operations. This doctrine is expected to be wholly operationally about the year 2005.

The new arms technology has decisively influenced military doctrines such as AirLand Battle 2000. Initiative and offensiveness are emphasized, with the purpose of isolating both the opponent's forces that are already engaged in battle and his reinforcements. Offensive strikes on objectives most critical to the aggressor – his air fields, supply depots, command and control lines and mobile forces - are considered first priority. Comparison of evolution of

ALB and the construction of the armed forces of a small country reveals a striking difference: the Great Power is able to create a concept and then the supporting technology, whereas the small country is always dependent on the available arms technology.

4.5 The evolution of NATO doctrine

Flexible response and its critics

Although NATO's European members were sceptical of U.S. willingness to risk an all out nuclear war with the Soviet Union on account of Europe, they adapted their strategic doctrines to the Flexible Response principle announced in 1967. The Forward Defence part of this new concept assumed that the defence would begin at the eastern borders of the alliance at the same level of action as the aggression. As little ground as possible was to be lost, and whatever was lost was to be quickly recovered. If the attack was not repelled, the danger of escalation would increase. Deliberate escalation might be instituted, to persuade the aggressor to cease hostilities. This could be achieved through a carefully selected and controlled use of nuclear weapons, or by extending the fighting to a geographic location or technological sphere where the opponent was inferior. NATO was prepared to use nuclear weapons first. The ultimate threat was a general nuclear strike against the opponent's strategic capability.[31]

The Forward Defence doctrine came under sharp criticism beginning in the 1970s. Fueling the criticism[32] were the conclusions drawn from the development of friendly and enemy arms technology. The air power and extensive mechanization of the Warsaw Pact forces rendered highly questionable a strategy that placed nearly the entire NATO forces along a thin line at the border. The peacetime bases of the troops were so far away from probable wartime positions that getting there fast enough was in no way guaranteed. The growing number of armoured troops of the eastern alliance increased the significance of tank battles in the final outcome, especially since the West had fewer tanks. Such numerical deficiencies in NATO's conventional forces increased the pressure on the nuclear option.

Nuclear weapons, too, came under continuous criticism,

especially tactical nuclear weapons, which were beginning to be viewed as both militarily ineffective and a risk for escalation. Their credibility suffered as a result. The new intermediate-range missiles were similarly criticized. Removal of tactical nuclear weapons would have created a higher escalation threshold between conventional weapons and intermediate-range missiles. Indeed this may have been the case during the late 1970s when short-range missiles were being removed from Europe. The dialogue indicated that defending Western Europe by conventional weapons alone was a seriously considered option. Arguing against this was the low cost of nuclear weapons.

In the beginning there were two potential solutions to the problems besetting Flexible Response. The advocates of Forward Defence argued that modification of the present doctrine was sufficient. While others supported a solution based on an effective area defence. Both options relied significantly on the new arms technology.

Where supply lines were deemed the aggressor's weak point, Forward Defence would be modified with the addition of mobile infantry units or new weapons. The opponent could be hit with the new antitank weaponry ranging from portable systems to cruise missiles, in activities spanning a wide area from front to rear. This approach would also make it unnecessary to resort to large-scale troop movements, or to make territorial concessions upon withdrawal - something that was criticized especially in West Germany.[33]

The central concept of the area defence model, which was intended to remedy the lack of depth in Forward Defence, was that the aggressor should be tied up by a deep defensive deployment, while one's own critical areas should be held at all cost. Potential enemy losses from having to commit troops to extended battles in a wide area were to be the deterrent. The area defence option would require the use of new antitank weapons, especially missiles. These, it was assumed, would make the defender equal to the armoured attacker. The aggressor would be tied up by small groups equipped with the new defence technology.[34]

Neither of the above approaches was accepted as the final solution. The discussion of options did nevertheless suggest ways in which the new arms technology could be exploited to improve

Forward Defence. Modern weaponry could remove some of the inherent weaknesses of infantry and enable the forces to be used more effectively. At the same time, existing doctrine could be interpreted more flexibly.

In a way, all of the options discussed were contained in the new Allied Army Doctrine of 1981, in which the Central Region was divided into covering force, main battle and rear areas. NATO member states employed their own battle doctrines in their respective zones. Dutch, Belgian and, to some extent, British forces had adopted modified versions of area defence. The Germans and, again to some extent, the British planned to fight with mobile armoured forces. The Americans, who were moving towards an offensive AirLand Battle concept, would exploit the latest technology. Such differences in approach, it was feared, created a certain instability within NATO.[35]

Follow On Forces Attack

In 1982, NATO's then commander Bernard Rogers began to promote a kind of European version of the AirLand Battle doctrine. The defensive nature of NATO, along with problems of incompatibility of the different national forces, prevented a direct adoption of the American version. Central to the European doctrine was stopping, paralyzing and destroying the second echelon of the aggressor before it reached the main combat area. This Follow On Forces Attack (FOFA) concept, as it was called, was initially based on purely conventional technology, but it soon became clear that the role of nuclear weapons, as the severest form of punishment and deterrence, could not simply be relinquished. Thus, a delayed deployment of nuclear weapons became the new policy. The doctrine was accepted as the basis for NATO planning on 9 November 1984.[36]

Actions in two major directions were taken under consideration in drawing up the conventional battle doctrine: (1) paralyzing or destroying the advancing second echelon troops of the Warsaw Pact and (2) dealing with its massive air strike capability. If these tasks could be carried through, then deep enemy strikes to the rear and attempts to concentrate overwhelming forces in the main combat area would be rendered

ineffective. In the same fashion, it was thought possible to prevent the new OMGs from joining the battle. Ways of repelling the aggressor's first echelon were discussed as well.

The organizational and technological improvements to the Warsaw Pact air forces received close attention in the drafting of the new NATO battle doctrines. Planes and helicopters were regarded as critical to the success of the opponent's doctrine and their use had therefore to be prevented. The fear was that aircraft from some 30 to 40 main bases might support the operations of the ground forces, with disastrous effects on the NATO air forces and rear.[37] In the early 1980s the only non-nuclear way of hitting these bases was by manned aircraft.

Long- or intermediate-range ballistic missiles equipped with conventional warheads could, it was thought, offer a new way of destroying the enemy air bases and forcing the remaining aircraft onto secondary airfields with poorer air defences. These back-up airfields would then be destroyed in a second phase with areal effect weapons of fighter aircraft. Evidently the development of ballistic missiles for this particular purpose was soon abandoned and, instead, the U.S. Joint Tactical Missile System (JTACMS) and Army Tactical Missile System (ATACMS) projects provided solutions for shorter ranges. Intermediate-range cruise missiles carrying submunitions could conceivably be employed to destroy the main airfields. There is no information to suggest that submunitions were used against airfields in the Gulf War, however.

Interdiction of the battlefield is probably the most difficult air force operation, calling as it does for penetrating through ever thickening air defences, locating the target in difficult circumstances and finally performing the attack. Indeed, it has been necessary to find a more reliable alternative. One such alternative was to stop the opponent's second echelon with much the same weaponry as used to destroy the bases, and to prevent follow-on echelons from reaching the main battlefield through missile strikes at choke points, bridges and railway intersections along the approach route. The disarrayed troops could then be destroyed or paralyzed by artillery and air-to-ground attacks.

The advances in electronic warfare have been decisive for aerial operations aimed at disabling air defences. Effective electronic surveillance, interference and deception are

prerequisites for the successful execution of the aerial component of FOFA doctrine.

The new tactical missiles would have allowed NATO to repel the first echelon as well, even before it reached the forward lines of defence. This type of operation would be carried out in two phases: air-launched precision weapons relying on sensors, targeting technology and sophisticated information processing equipment would be employed 100-300 kilometres in front of the forward edge of the battlefield (FEBA), while ground-fired precision missiles having a range of 30-100 kilometres would paralyze enemy forces in the immediate vicinity of the main combat area. In principle, these two tasks could be performed with different versions of the same system.[38]

Munitions exploiting new homing technology at the end of their trajectory would be deployed against enemy troops engaging NATO forces. Multiple launched rocket systems (MLRS), mortars or artillery could be used as launchers. It has been estimated that, equipped with submunitions, the 12 missiles of a MLRS would have the effect of a one-kiloton nuclear charge but at one fifth of the cost.[39]

The development of the antitank missile was presumed to give the defender a clear edge over the aggressor. Helicopters equipped with antitank missiles would be used to paralyze any small tank formations breaking through the line of defence.

The target surveillance and command system developed in the early 1980s was not adequate for destroying targets deep inside the enemy rear. Now, however, newly deployed systems such as the Joint Surveillance and Target Attack Radar System (JSTARS) and Mobile Subscriber Equipment (MSE) are supporting the concepts relying on new arms technology. At the same time, command models that once depended on the human factor are changing, incorporating more technology and becoming more automated. Rapid communications provide the military leadership with up-to-date information regarding the battle situation, and the delay in directing troops is reduced. Indeed, the new doctrines stress speed and surprise.

Other doctrinal consequences

So far we have examined the direct effects of arms technology on NATO battle doctrines. The described advances in arms technology also had consequences for strategic doctrine. The combination of the Rogers (FOFA) doctrine with Forward Defence gave Flexible Response more credibility and added to its deterrent value.

The most important new element was the capability to carry out a missile strike against the opponent's supply lines deep inside its territory. Aircraft would then be freed for less dangerous operations than flying deep inside Warsaw Pact territory.

Advances in the weaponry of both sides influenced the structuring of tasks in the Forward Defence. In order of importance these tasks were:

- aerial counter activity
- interdiction of the battlefield
- attack against the echeloned and mobile ground troops following after the first wave
- dealing with massive tank invasions.[40]

Repelling the initial attack, previously viewed as the primary task, had thus lost some of its importance.

It was widely believed that improvements in the direct defence capability, by delaying the opponent and allowing time for decision making, would slow the escalation towards a nuclear counter-attack.[41] The nuclear threshold would rise as the capability to wage conventional war improved. As long as the threat of at least strategic missiles loomed in the background, deterrence would remain strong, preventing a surprise attack. The function of nuclear weapons, therefore, was to maintain risk and deterrence. The gap between projected and existing technology remained great, however. The most optimistic doctrinal concepts would have seen a practical realization only in the distant future. Against all this, some analysts argued that advances in conventional weaponry would not necessarily have raised the nuclear threshold; they might have done just the reverse.[42]

The discussions about the new battle doctrine also addressed the protection of NATO's flanks, whose strategic significance increased during the 1980s, at least in American planning. New technology strengthened the effectiveness of the alliance

reinforcing system. With the improvements in firepower and aerial and naval mobility, reinforcements could be dispatched quickly, even to remote locations such as northern Norway. The use of missiles in central Europe would free more of the newest aerial technology to the north where an all-weather and dark flying capability is required during most of the year. The Danish straits could be defended by conventional missiles. In the same way, battles for the southern flank would be influenced by the new arms technology.

The capability to open a new front depends on adequate infantry units and support from other branches early in the battle. As lighter air- and sea-transportable technology became available, the time required to move troops and initiate hostilities shortened substantially. Today, these forms of transport are capable of moving armoured fighting vehicles and light combat tanks. As well, small calibre artillery can be transported with infantry troops. Portable antitank weapons and missiles allow a quick antitank response. Missiles play a significant role in air defences. Air forces, capable of ranging over great distances, provide effective fire support and air cover. Helicopters can operate from either ships or land bases, and their logistics support facilities can quickly be established at temporary helicopter bases at battlefield bridgeheads. The new arms technology substantially increases NATO's ability to expand the area of war.

Developments during the late 1980s.

By the mid-1980s, there was general agreement in Western Europe that the basic military doctrines of the two alliances were solid. The Warsaw Pact's offensive and NATO's flexible response doctrines had not changed and were not expected to change significantly in the future. Many individual aspects of the strategy became reinforced in response to the emergence of new weapons. Battle doctrines, on the other hand, became increasingly offensive in nature. Possible deployment of Operational Manoeuver Groups (OMGs) by the Warsaw Pact was perceived as a logical extension of existing technology. The methods of deploying new weapons by the Western alliance were a response to technological and doctrinal developments on the other side and the criticism of the

alliance's earlier shortcomings.

In both alliances, doctrine was reshaped in response to the technological advances of the other side. This took place along two paths: first, counter-weapons were developed as fast and as far as the prevailing technology would allow, and second, the enemy's methods of using its new weapons and the consequences of this for enemy doctrine were carefully evaluated. Doctrine was then modified, taking into account the characteristics of the new counter-weapons and the results of the evaluation. Although the practical foundation for the change in doctrine was the new technology, many of the other factors influencing doctrine were, of course, at work as well.

Technological developments caused the following features to become central to the doctrines of both alliances:

- expansion of the battle area in depth and in width
- emphasis on combined-arms operations
- aerial operations and the increased importance of helicopter and tactical aircraft support for ground forces
- increased emphasis on offensive operations
- re-organization of forces to accord with new arms technology
- increased emphasis on mobility and the element of surprise, and
- increased flexibility in operations.

Conventional technology could not replace nuclear weapons as the fundamental element of deterrence. As a result of technological improvements, however, many tasks that formerly were assigned to tactical nuclear weapons were now assigned to conventional weapons. The Warsaw Pact's expanded range of nuclear weapons suggested that it was technically more prepared for a nuclear war. For both alliances, the range of choices for the battle area expanded. Both alliances now had the capability to choose the degree of their nuclear retaliation. The heightened risk of escalation began to act as a constraint against the use of nuclear weapons, and against war in general.

It was commonly believed in the late 1980s that both alliances would increase their deployment of new arms technology in the future. The Soviet deficiencies in high technology would be compensated for by their ability to mass produce reliable and relatively modern weapons. Western mass production of high-tech weaponry would continue to be held back by the staggering

cost and the unwillingness of NATO member nations to commit scarce economic resources to developing the military sector.

The dramatic changes that took place at the end of the decade were especially surprising to analysts who had predicted the maintenance of the status quo. The threat of attack, against which the Western doctrine had been designed, began to dissipate rapidly. German unification, collapse of the Warsaw Pact and the withdrawal of Soviet troops from central Europe created a friendly no-man's-land – Poland, Czechoslovakia, Hungary, Belarus and Ukraine – between the Forward Defence and the traditional threat. The idea of strong forward presence lost its meaning. It was no longer conceivable that a surprise attack would soon be followed by a destructive second echelon. The threats against Western Europe now came from a different direction, and even the validity of FOFA needed to be reconsidered.

NATO decided upon its new strategic concept at the Rome Conference of November 1991.[43] The significant points were mapping out the threats from different geographical directions, without knowing their exact nature or degree; a shift from military defence towards cooperation and coordinated security issues; increasing the multinationality of the defence arrangements of member nations; force reductions; and altering the areas of responsibility. It was also significant that the United States committed itself to reducing the number of its European forces to 150,000[44] or even less by 1995.

The nature of NATO battle doctrine is not yet known, but the strategic concept is a renewed version of Flexible Response that calls for flexibility in previously unforeseen ways. Forward Defence becomes Forward Presence inside German territory, and the number of troops at the alliance's former Eastern border will be reduced. It can be expected that the main concepts of FOFA will remain useful in the new battle doctrine, but penetration of an aggressor into alliance territory might require an intense AirLand Battle-type counter-offensive from troops not entirely prepared for it under the old system.

In the face of the new arms technology, the massed use of forces has lost its meaning. Use of Rapid Reaction Corps in different parts of the Allied area requires increased harmonization of troops and weapons such as provided for in the Treaty Limited

Equipment (TLE) part of the CFE agreement. Harmonization of troops and getting used to the enlarged operating areas will take some time. Thus battle doctrine cannot immediately respond to the new challenges. Overall, however, present arms technology even today supports the execution of the new battle doctrine. By way of conclusion it can be said that the role of political and geopolitical and thence also economic factors in shaping doctrines has increased, while the role of technology has decreased.

5 ARMS TECHNOLOGY AND THE DEFENCE DOCTRINES OF NEUTRAL COUNTRIES

5.1 Arms technology and Finnish military doctrine

The Finnish defence doctrine is based on the functions of the defence forces prescribed by law and the principle of area defence that became policy in 1966. Policies have been formulated in decisions concerning the objectives, grounds, specific tasks and practical execution of military activities and how these relate to other aspects of national defence.[45] The doctrine has been made public in the communiqués of Parliamentary Defence Committees, a 1986 statement of the Defence Council and the directives and manuals of the defence forces. A specific written summary of military doctrine did not exist before the CSCE doctrinal seminars of 1990 and 1991.

Finnish military policy, which has not undergone significant change since the 1960s, can be described in terms of strategic defence and an area defence system. Advances in arms technology have mainly been reflected in changes in descriptions of the battlefield, and to some extent in a reassessment of the importance of the various service branches and weapons systems.

The underlying objective of Finnish policy has been to secure the independence and well-being of citizens by maintaining a level of defence capability that would prevent the country from being drawn into a conflict. Finland has attempted to create an overall defence system that is resilient and effective and capable of inflicting unacceptable damage on the aggressor. If necessary the country must be capable of repelling an attack in order to buy time for political manoeuvring. Despite the advances in arms technology, this doctrine of relative deterrence has proven to be durable in nature and the overall defence system to be a suitable approach amenable to further development.[46]

In accordance with her neutrality, Finland defines the threat against her in such a way that the possible aggressor is not named. There has been little reason to change this practice since the 1960s. Military activities would presumably be the result of a larger European conflict in which Finnish territory was threatened

by outside exploitation or transit. Although the new situation in Europe in the early nineties has altered the nature of the threat, Finns are awaiting a clarification of the European security architecture and the situation in Russia before altering their military doctrine or defence policy.

Implicit in Finland's concept of territorial defence is that resistance begins at the country's borders. The defence wears the aggressor down by using weaponry and the size of the territory to its advantage. The enemy is denied access to critical areas by halting its attacks in areas of terrain advantageous to the defence. The enemy will be beaten back by the counterattacks of reserves. Local defence and guerilla activities are important on the flanks and in the rear of the invader. The army, which is responsible for most of the fighting, is supported by the air force and the navy.[47] Although Finnish doctrine has remained essentially the same, some modifications have been made in response to the new arms technology.

The attitude towards nuclear weapons has not changed significantly. Although the continued evolution of nuclear weapons, in combination with doctrinal changes, was thought to increase the chances of the weapons being used, the likehood of anyone ever using them against Finland was considered small. More recently, the credibility of nuclear weapons has dissipated. Protecting the population from the consequences of a nuclear accident or of a nuclear war elsewhere is the task of the civil defence. Ground troops are trained to operate in areas that have been contaminated by weapons of mass destruction. The mainly political threat of nuclear cruise missiles has been met by intensifying air defences along the anticipated flight paths, especially in north. Finland never considered nuclear weapons necessary for itself, not even in the 1960s when the matter was under consideration in Switzerland and Sweden.

Changes in the air forces of the superpowers required the army manual description of the battlefield to be rewritten. The increased threat of airborne attacks encouraged the large-scale development of an air defence network for the protection of troops and critical installations. As an important strategic region, Lapland, even in time of peace, has a well-equipped air wing and air defence unit. The heightened military-political importance of the Baltic Sea area was one reason for locating a fighter wing at

the Pirkkala base near Tampere. The protection of Helsinki, the country's capital and economic hub, with defensive long-range missiles reflects the increased threat of a surprise aerial attack. The purchase of medium-range surface-to-air missiles is further evidence of the greater importance attached to air defences. It can be stated that the procurement of new arms technology ensures the effectiveness of the doctrine in the face of new enemy weapons. Command and control systems have been improved so that the air battle command covers the entire country. Finland is acquiring new fighter aircraft and special attention is being given to optimizing the speed and flexibility of their operation in strategic areas.

Advances in landing craft technology encouraged a modernization of the Navy and Coastal Artillery during the 1970s and 1980s. When it was discovered that the Navy was only able to defend the Finnish territorial waters around the northern Baltic Sea or the mouth of the Gulf of Finland, and not both, new missile boats were procured and coastal defence systems improved. The myriad islands and treacherous waters off the Finnish coast make minelaying a significant part of coastal defence. New, domestic technology in this area has facilitated the realization of an earlier operational concept. The objective of the Navy modernization programme has been to keep the performance level in line with the threat. The focal points in the development of naval defences have been the prevention of territorial violations and improved underwater surveillance.

Lapland and southern Finland are the two most important strategic areas. The significance of Lapland has been heightened by the development of Soviet nuclear submarines and the Soviet Northern Fleet with its air force, and by the NATO systems serving military purposes in Northern Norway. In the south, the coastal area has assumed more importance with the increase in naval and air force activity around the Baltic Sea. The improved mobility of the opponent, it is thought, facilitates its taking advantage of these two strategic areas. Finland's goal has therefore been to develop the capability to deploy her forces flexibly throughout the country. This has been done in two ways: a strong peacetime brigade has been permanently stationed in Lapland, and the mobility of forces intended to man strategically important areas has been improved by equipping them with

tracked infantry vehicles and armoured personal carriers.

Development of the army to correspond with doctrine has been difficult. During the past decades, improved mobility of the opponent, enlargement of the battle area, increased firepower and better armoured protection posed new challenges for the defence system, and the principles of troop employment had to be re-evaluated. Fighting units were divided into two distinct categories: fast deployment and main forces. For economic reasons, it was necessary to focus on critical areas. Great improvements were made in the mobility, firepower, anti-air and antitank weaponry, and armoured protection of the fast deployment troops, whose task is to buy time by wearing down and slowing the invader. Owing to lack of resources, it has not been possible to equip the main force to the same degree. Consequently, their task would be to stop the invader and stabilize the situation. Driving the opponent out of Finnish territory would require units that possess more mobility, firepower and armoured protection than those at present do. The goal for the nineties is to equip the major troops in keeping with the changes that have taken place at the battlefield level. Battle readiness will be improved by emphasizing mobile operations and flexibility, which are inherent parts of active defence. The greater threat of attacks to the rear increases the importance of local defence. Unfortunately, there have not been adequate resources to modernize the forces designated for this task.

The increased threat of a surprise attack and greater scope for territorial violations created by the new technology has put added pressure on national defence even in time of peace. The ability to manage lower levels of crisis than war has become an important consideration in setting the criteria for the Finnish defence capability. Special attention has been paid to the deployment of reconnaissance and guerrilla units and to terrorist activities in other states. Preparing a resistance to these activities and protecting of important installations are now central tasks of the local defence. Indeed, the developments described above led to a re-evaluation of operational principles. The present objectives are to be able to take care of peacetime surveillance tasks and flexibly to mobilize fighting forces in response to any threat that may jeopardize Finnish security. The goal is to maintain the capability to repel a limited conventional attack.

5.2 *Finland and a changing Europe in the 1990s*

Although Europe has undergone dramatic change and the doctrines of many countries have been altered, Finland has not significantly modified its strategic policies. From the Finnish perspective, the Nordic military and political environment, which for a long time was stable, has even become more uncertain. At the same time, the end to political bipolarism and the lessening of tensions between the two superpowers have been witnessed with relief. Uncertainty about the future nevertheless forbids any relaxing of national defence. The doctrine and the way it is being executed continue to fulfill the requirements of military security and appear to satisfy the expectations of Finland's immediate neighbours as well as members of the European Community.

Minor changes will be made in the execution of the defence policy, especially at the administrative and operative levels. These, however, are mainly a response to limited economic resources and the need to improve efficiency. A new command and administration system will come into being at the beginning of 1993, rationalizing the defence system by removing overlapping units and unnecessary layers of command. The country will be divided into three national defence regions, each with command of its own service branches. The military districts commanding peacetime forces will be subordinate to the regions.

The current modernization of the army Jaeger and Armoured Brigades is the natural continuation of earlier reorganization and rearming, responding to the new conventional weaponry of the opponent. The modernization is aimed at increasing mobility, firepower and protection. With the shortage of resources, optimal development is not possible. Detailed planning and exploiting of the special features of Finnish terrain are, therefore, crucial to the development of battle doctrine.

Aging of Finland's existing fighters has necessitated a speedy modernization of the air force. An agreement has been signed to acquire fifty-seven modern interceptors and seven training aircraft (F/A 18) by the end of the decade. The air force modernization programme shows that airspace has maintained its place as an important part of doctrine. In both the air force and navy modernization programmes, the effort has been made to find the

most practical solutions in arms technology - a task not made easier by the present pressure on resources. The internal organizational changes in Baltic navies, combined with foreseeable military and political changes around the Baltic Sea, are likely to decrease the importance of the navy in the short run. Pressures to maintain a viable domestic shipbuilding industry, on the other hand, argue for the continued existence of the navy component.

In a recent statement, Admiral Jan Klenberg[48] listed the military threats against Finland in the following order: (1) a surprise attack to subjugate the state, (2) an offensive against a third party through Finnish territory, and (3) a large-scale attack to invade the country. To some extent this order is reflected in the development of the different sectors of national defence. The overall goal, nevertheless, is the capability to repel all three kinds of threats and contingency plans responding to all three scenarios are constantly under development.

5.3 *Changes in Swedish threat perceptions and doctrine in the 1980s.*

The Swedish analyst Wilhelm Agrell emphasizes that threat is a significant part of doctrine.[49] The implication of an opponent's technological advances can, to some degree, be concluded from changes in the perceived threat. In the case of Sweden, the main factors persuading such changes have been an increase in the operating range of Great Power forces and in mobility and speed on the ground, at sea and in the air. The following fields of technology have been especially important:

- optronics and information processing technology used in surveillance and precision weapons,
- electronics and information processing systems used in military communication, electronic warfare and guidance systems,
- technology that increases the firepower and effectiveness of weapons,
- ground and air transportation technology that facilitates increased protection, mobility and capacity.[50]

The implications of nuclear weapons for the battlefield and the rear were widely studied in Sweden in the 1960s. Even the

acquisition of a Swedish nuclear deterrence was discussed. Since then the Swedes have been content with protecting their military and civilian populations from nuclear attack and from fallout that may originate outside the country.

The longer range of tactical aircraft and the deployment of long-range cruise missiles in the 1980s posed a growing threat to Swedish airspace. At about the same time, both alliances developed a more pressing need to acquire forward bases and air surveillance facilities in Swedish territory. The widespread deployment of helicopters increased the risk of airborne attacks.[51]

Aware of the increasing number of crises and armed conflicts, by the mid-1980s the Swedes began to feel a degree of 3uncertainty. Territorial violations and new types of threats seemed probable. In each case, advances in arms technology were mentioned as contributory.

Prior to the 1980s, Swedish doctrine was rigidly defensive. Potential invaders were to be stopped as far from the border as possible. Technological superiority of the Great Powers, combined with Sweden's limited resources to develop its military forces, compelled a change in doctrine. By the early 1990s the new doctrine required that the attacker be prevented from obtaining a solid foothold on Swedish territory and quickly using it for his own purposes. The defence capability was to be maintained not only at the borders and along the coast but in the interior of the country as well. The battle was to begin at the borders, flex regionally and, where possible, the invader was to be pushed back, or at least hindered from reaching his operational goals.

The principles guiding development that had been announced in 1982 remained in place until the end of the decade. A process of rationalization was begun with the creation of more effective forces relying on new technology. Units and weapons systems were to be improved without change in the basic composition of the military. As the chances of a surprise attack were perceived to be increasing, special attention was paid to readiness and to mobilization arrangements.

Development of the army proceeded with a view to the increased threat from the air and need for a defence against fast moving ground forces. Fighting capability, firepower (especially antitank capability) and mobility were the focal points of attention. An apparent doctrinal inconsistency began to generate discussion:

Was the objective to drive the invader out or merely to hinder his operation? The former was declared as the main policy, but the latter was considered to be a definite option should the situation become unmanageable. Since the threat of an air mobile attack remained great it was recommended that the forces should be dispersed throughout the country. A model of a counterattack by small units over a wide area was included in the army battle manual. This approach was adopted not only for the aforementioned reasons but to prevent the opponent from concentrating its forces against Swedish forces that might be in the process of preparing a decisive strike. The model called for the use of small, efficient units to splinter the invader's forces and destroy them piece by piece. The invader would be tied up by fire in areas where it was superior. The doctrine specifically emphasized the need for a large number of units. The defence of key installations was stressed in view of the increased threat from air mobile attacks and sabotage activities. Less well-equipped brigades were to be used along with new and better equipped local units for this purpose. Large mobile reserve forces were regarded as necessary to move the focus of action according to the threat.[52]

Advances in technology were also perceived to improve the Swedish ability to defend. Accurate, long-range weapons could be scattered and hidden from the enemy and their fire concentrated on selected critical targets. This offered a new lease on life to the somewhat old-fashioned armoured brigades. Indirect antitank activity, mines and mechanization were seen as factors strengthening Swedish operations. The use of antitank helicopters was incorporated into army tactics. The ability to counterattack in a variety of circumstances was considered important.

Air defences were updated by improving the mobility, operational speed, diversity and flexibility of systems. The greater threat from the air made the air force more important to national defence. Modern, domestically produced aircraft were considered a safeguard of the defence policy. Lightweight, portable air defence missile systems were needed in great numbers to counter the helicopter threat. These would be used in the rear of the invader as well.

The limited availability of new weaponry was reflected in the strategic doctrine. Faced with the U.S ban on high technology

exports, Sweden had to rely on its own resources. Indeed, Sweden intends to maintain its arms industry, continue research and increase cooperation with other, mainly neutral, countries. At the same time, Swedish defence is changing from being a purely military matter to one involving other branches of administration as well. The new threats to communications systems posed by advances in enemy arms technology encouraged Sweden to develop command systems for crucial civilian fields and to ensure the crisis-time operation of the central command system.

5.4 *Swedish defence policy in transition*

The radical changes taking place in Europe in 1990 created confusion in Swedish defence policy. The commander of the armed forces wanted to continue equipping the forces more or less in the manner described above. During the hearings of the Parliamentary Defence Committee, however, some political factions, Social Democrats in particular, criticized security and political assessments and defence planning in general. Concluding that the earlier threat no longer existed, they called for cutbacks in the armed forces. The willingness to allocate resources for defence purposes diminished and a new "nucleus"-model began to take shape: only a nucleus force should be equipped with modern, expensive equipment, while the size of the mobilized wartime forces should be drastically reduced. The Committee could not reach a consensus, with the result that the 1991 Defence Decision was delayed.[53]

Just recently, a decision was reached to begin planning of cuts. During 1992, Parliament will consider a proposal that would close fifteen bases and cut personnel by as much as 25%. The number of brigades would drop to under twenty, of which only ten would receive modern equipment. Invasion of the whole country is no longer perceived to be a threat. The defence forces, now reduced in size, are to be able to repel a surprise attack on short notice. Providing it could be used flexibly in different parts of the country, a smaller, crisis management force would be adequate.[54] Present arms technology is seen to allow the creation of more effective forces and ensure their rapid movement from place to place according to the threat.

The threat from the air remains great. The commander of the armed forces has warned of the weaknesses of the air defences. Although the number of aircraft is being decreased, the Swedes are striving to employ modern, domestically manufactured, equipment. The development of a new fighter is a prime example of this. Indeed, the overall goal is to become as self-sufficient as possible in military hardware.[55] Other considerations besides defence needs, employment in particular, have influenced this decision.

5.5 Swiss doctrine in the 1970s and 1980s

In 1973 a new security policy and a comprehensive defence plan were made public in Switzerland.[56] The strategic defence doctrine was based on a "two-component" model providing for (1) general peacekeeping and crisis management and (2) military and civilian defence aimed at achieving "Peace in Freedom". The tasks of the military defence were to prevent war by maintaining a defence readiness, repelling attacks against Swiss territory and assisting civilian authorities.

The principles of the doctrine were inspired by historical experience, and the operational practices drew, among other things, on World War II troop positions. The militia was to engage the enemy at the borders and the battle was to be fought in defensive zones that had been mined and fortified during peacetime. The opponent should be prevented from achieving its operational goals and at least the vital parts of the country should be kept in Swiss hands.

The importance of crisis management was stressed in the early 1980s. The modern weaponry of the two major alliances surrounded the country and posed various levels of threat, ranging from mild tension to outright invasion. Within the context of total defence, peace should be guaranteed by preventing, with appropriately scaled measures, the tendency to escalation. Defence contingency plans were developed, in response to various threat scenarios identified in an analysis of possible situations. The increased threat of a surprise attack suggested the need to improve the already existing capability for rapid mobilization. Special readiness forces were formed to fight the battles of the

first few hours.[57]

The strategy took into account the modern equipment of the potential aggressor. Battle would be fought primarily against mechanized troops supported by strong aerial and artillery fire. Increase in the firepower demanded more attention to fortifications. Enemy ground and air mobility was to be countered by deep formations exploiting the fortifications and terrain. It was assumed that, with the increased pace of modern warfare, some areas of the country would be lost. The Swiss were thus prepared to continue the battle by guerrilla tactics. Use by the enemy of its most effective weapons was to be hindered by conducting operations among its formations. Deep enemy strikes were to be met by tank and air force counterattacks. Requests were made for new antitank technology and more of the antitank weapons already in use. Regardless of the opponent's arms technology the Swiss considered that the small size of the country and psychological factors left them no alternative but to engage the enemy at the borders and to carry the battle throughout the country.

The advances in air power elsewhere demanded a strengthening of the air defences, which long had occupied a prominent place in Swiss doctrine. The task of the Swiss air force was to prevent the enemy from achieving air superiority and to minimize the effects of any attack on Swiss ground troops. The air force would play the key role in moving over from normal conditions to defence. A further task was to lend fire support to the army. Attention was also given to improvements in airspace surveillance, the early warning system and ground troop air defences.

The acquisition of nuclear weapons was still under consideration in the mid-1960s. Although the idea was eventually abandoned, the nuclear threat was recognized in military doctrine. The area where the two alliances met in common borders was believed to be a likely location for the use of nuclear weapons.

Recognizing the swiftness of modern warfare, the possibility of surprise attacks and the advances in electronic warfare, the Swiss have taken pains to ensure the protection of their command systems. Switzerland is in the process of installing a new communications system, which, to satisfy the exceptionally high quality requirements, had to be developed domestically.

Domestic arms production plays an important part in Swiss defence thinking. Essential equipment must be available even were the country to be rapidly surrounded. Advances in arms technology outside the country have been responded to by the acquisition of counter weapons and by training troops in the use of these.

5.6 *Principles of the new Swiss security policy*

The recent changes in countries nearby and in Europe in general have necessitated a re-evaluation of Swiss security policy. On 1 October 1990 the Swiss government released an interim report on the new policy.[58] Another significant doctrinal assessment is the defence forces reform, "Armeereform 95".

The 1990 report lists the goals of the new security policy as follows:

- maintenance of peace while free and independent
- maintenance of freedom of action
- protection of citizens and their basic rights,
- territorial integrity, and
- the promotion of international stability especially in Europe. Protecting the basic rights of Swiss citizens and the promotion of international stability are new emphases.[59]

The restatement of policy indicates a change in threat perception, a change influenced, among other things, by advances in arms technology. New security and political tasks have been assigned to the defence forces. The Swiss emphasize, however, that they by no means intend to weaken their traditional defence.

Troop levels are to be cut by approximately one third, but the remaining troops will be equipped and trained to deal with a wider range of threats and new tasks. These new tasks may include taking part in U.N. peacekeeping operations, providing aid to East European countries in the form of training and know-how, providing security arrangements for conferences and assisting in the verification of international agreements. Since it would be next to impossible to assess the implications of new arms technology in these fields, the Swiss defence reforms should mainly be seen as improving the traditional defence capability.[60]

The acquisition of new fighter aircraft suggests that

development of the air arm will continue. The decision to acquire F-18 fighters has been finalized. Though the number of planes is small, the purchase is an indicator of the importance conceded to air power even at a time when the region of potential East - West confrontation has shifted away from Switzerland.

5.7 *Austrian doctrinal thinking*

Much like Switzerland, but already back in 1965, Austria identified several different threat scenarios:

- a crisis situation, in which international tensions rise and the risk of conflict increases,
- a neutrality situation, in which neigbouring countries are at war,
- a defence situation, in which Austria is under attack.[61]

The value of this sort of contingency analysis grew as arms technology evolved. The assessment that the aggressor would seek surprise and implement combined-arms operations of overwhelming air and ground forces was shown to be correct; for both alliances began to deploy weaponry that would allow them to engage in just such operations.

In view of the increased offensive capability of both superpowers, area defence was chosen as the strategic concept. In the development of the doctrine, a solution was sought to a situation in which the aggressor attempted swiftly to take important areas even in the interior. Area defence has been executed by the selection of easily defendable key zones whose access roads could be blocked. Key areas within the zones have been fortified to ensure that the zones are held. Lands between the zones are regarded as security areas and would be used primarily to secure operations. The enemy would be engaged only lightly in these areas.

The increased threats of surprise attack and outside intervention that Austria felt in the 1980s encouraged her closer attention to mobilization, defence readiness and troop composition. Readiness forces that would be in constant alert mode were created to respond quickly to any crisis situation. The forces were to be equipped with modern weapons. The main battle tanks in particular are very modern, and steps have been

taken toward their production within Austria. The characteristically large battlefields of modern warfare make it important to tie up the enemy on his flanks and in the rear. Local forces, which would sometimes be used in guerrilla-like operations, were created for this specific purpose. However, emphasis is now shifting towards the conventional style of battle.

Developments in the air forces of the Great Powers have had several implications. Clearly, movements and counter-attacks involving large troop formations were to be avoided in the event of an attack. Originally a response to new arms technology, this policy found a natural reinforcement in geographical factors. Air defences have been improved, despite a clause in the State Treaty imposing limits on such activities. A sophisticated radar network has been constructed for the surveillance of Austrian airspace and a number of interceptors have been acquired. Helicopters are of considerable importance, given the nature of the terrain and the pace of modern warfare, and Austria has acquired about a hundred helicopters. Resources have also been allocated to improving the air defences of troops.

Austria's position on nuclear weapons is the same as that of the other neutral countries. The threat posed by cruise missiles, however, has generated a different response. The missile ban imposed on Austria was considered to reduce her responsibility for airspace and, as a result, defences against cruise missile have not received any funding.

As in Switzerland, the efficiency of the command system and assuring the ability to mobilize received close attention. Advances in arms technology were considered often to place the defence capabilities of small nations in doubt. Austria responded to the challenge by increasing the number of her troops and by equipping and training them in accordance with the requirements of modern warfare. Large-scale, demonstrative military exercises were yet another part of the policy.

In the wake of the changes in Europe, Austria now finds herself back-to-back with the eastern European countries. Simultaneously, threats from the southeast, from Yugoslavia and Hungary, have emerged. Since Austria does not have a frontier guard, border tasks have fallen on the shoulders of the Bundesheer. Policy-makers would also like the Bundesheer to assist in catastrophies at home and abroad, to provide technical

assistance at accident sites, to protect citizens in a broader way than before and to assist in international tasks of verification, observation of manouevres, peacekeeping and military training.[62] The basic defence tasks of the Bundesheer remain as well. Although a lessening in the threat posed by new arms technology is partly responsible for this broadening of tasks, the main cause is political developments.

Austria has no plans to alter its area defence policy, though even the man responsible for it, General Emil Spannocchi, has stated that it is no longer necessary to defend the whole area or to buy time against the Russians. He has, in fact, proposed reductions in the size of the military and suggested that half of each age group cohort inducted should be trained as frontier guards and environmental protection forces.[63]

Despite proposals like these, further development of defences is clearly needed. The fact that certain restrictions on Austrian military purchases imposed by the two alliances were unilaterally nullified on 6 November 1990 confirms that this, indeed, is the case. Austria is now able to purchase missiles and aircraft that contain German or Japanese parts. In reality Austria had already earlier acquired both Draken fighter planes and antitank missiles containing parts from these countries, but now such acquisitions have juridical status. Evidently defensive surface-to-air missiles are also to become a part of the Austrian doctrine.

5.8 Factors modifying the effects of arms technology

The threats arising out of advances in arms technology of the potential aggressor have not affected the military doctrines of Finland, Sweden, Switzerland and Austria directly. Other factors, as listed in section 2 above, have operated to modify the effect, though not in the same way in all countries.

To compensate for technological deficiency the terrain may be exploited to advantage. Finland, for example, has responded to the tank threat with plans to fight battles in areas favourable to its own troops. Finland does not, in other words, base its defence solely on weaponry. In the same way, Switzerland and Austria rely on the protection of their mountainous terrain. The development of the air forces of the Great Powers has not elicited

a full response in the Finnish Doctrine; for poor weather and lighting conditions have always argued against air force effectiveness. Another factor that tempers the effect of the new technology is that the Finns have always felt themselves to be at the perimeter of the main European military theatre. Any large-scale concentration of modern weapons systems against Finland has been considered unlikely.

Of the political factors international treaties have considerably influenced doctrinal behaviour. Limitations on the type or quantity of weapons a country can acquire have influenced the development at least of the Finnish and Austrian air defences. Political decisions and an unwillingness to commit resources to national defence have affected the development of the fighting capability of these countries to the extent that the new threats have not had their full effect on doctrines.

In many cases the cost of the technology that would support a particular doctrine becomes the deciding factor. Economic resources may be insufficient to effect a particular modernization. Likewise, a country's technological level, raw material base, level of research and structure of industrial production may work against the realization of a particular doctrine.

Existing troops and the state of their equipment have been significant among the military factors. Training has sometimes been a problem when the new doctrine required the ability to master complex technology.

5.9 *Comparative analysis*

A comparison of the military doctrines of Finland, Sweden, Switzerland and Austria shows that none has changed much over the years, even though strategic policies and defence principles were decided upon long before the newest arms technology was developed. The different variants of area defence provide a reasonably good response to the threats posed by modern technology, and the new weaponry acquired appears to reinforce the established policies. Nevertheless, there have been shifts in emphasis within doctrines and changes in battle concepts.

All four neutral countries have responded to the development of nuclear weapons in the same way. The population

has been prepared for the consequences of them being used elsewhere. Although forces have been trained to function under nuclear fire the training has not been extensive. The development of the cruise missile has been responded to in the form of improved air defences.

Advances in aircraft technology have enhanced the importance of the air force, especially in Sweden and Switzerland. In Finland and Austria both political and economic factors have acted as a restraint. Weapons acquisitions and troop reorganizations underline the increased importance of air defences. Austria's failure to acquire missiles is mainly attributable to political factors.

Greater aerial mobility has increased the importance of readiness to fight on a wide and deep battlefield. The deployment of ever more effective troops in the defence of vital installations appears to be the trend. Increased mobility of the aggressor has necessitated improving the mobility of one's own troops as well. Sweden and Finland have improved both the terrain and road mobility of the troops that will fight the decisive battles. In Austria and Switzerland, the focus of improvements has been the mobility of the reserves. The usefulness of helicopters in moving troops and firepower has been recognized. It can be concluded that even doctrines based on relative deterrence have increasingly assumed offensive characteristics.

The precision and areal weapons of the two alliances have been taken note of only in the latest threat scenarios. It seems probable that the challenges these weapons pose will be met by acquiring limited numbers of counter-weapons and more especially by elaborating tactical and operational doctrines for declining troop numbers, within the context of present defence decisions and emerging security concepts. Increasing flexibility, abandonment of rigidly defensive models, strengthening of territorial defence especially against terrorist activities and aerial attacks, and an effective utilization of crisis management can be assumed to be the main trends for the future. The move from an absolute capability to defend towards relative defence based on unacceptable damage to the aggressor would seem to be continuing.

6 CONCLUSIONS

The analysis presented above leads me to conclude that arms technology influences military doctrines in two different ways. The first is the traditional weapon – counter-weapon response, where the enemy's new technology stimulates the development of counter-weapons. In this case new technology causes changes in the perceived threat and thereby in battle doctrine. The second way proceeds through the opponent's doctrine, which changes in response to the new arms technology and, in turn, causes the other party to adjust its doctrine. In some cases the end result will be different from the result that would have been reached in the weapon – counter-weapon process.

All the factors mentioned at the beginning of this report (section 2) have influenced the development of doctrines. In earlier years, however, weapons and the way they were used had a decisive influence on tactical and operations battle doctrines and a considerable effect on the development of strategic policies. In more recent years it would appear that, on the strategic level, political and economic developments and changed security assessments, have diminished the weight of arms technology as an influencing factor. In the area of battle doctrines, on the other hand, arms technology has assumed increasing importance, at least for the Great Powers and the two military alliances.

Economic resources and changes in the political situation have determined the direction of recent developments in small countries. Where other countries are clearly cutting back on their military expenses, however, Sweden and to an extent Finland appear to be maintaining their earlier policy. This is largely a result of their geopolitical location, historical experiences, the continued instability in Russia and questions regarding security as a member (or non-member) of the European Community.

The reductions being made in nuclear arms would appear to lessen their deterrent value. Total abandonment of the nuclear deterrent is not, however, foreseeable in the near future. On the contrary, the idea of deploying nuclear weapons as a deterrent appears to have crept into the doctrines of developing nations as well. The importance attached to missile defences has increased in military doctrines.

Significant qualitative changes in doctrines include an increased flexibility to handle diverse threats, the need to react faster and with fewer troops than before and increased width and depth of combat areas. New patterns of thought are apparent in the more frequent references to international cooperation in doctrinal texts, the practical examples of such cooperation in actual military and security-political activities and the inclusion of new types of security threats as areas of responsibility of the armed forces.

NOTES

1. Barry R. Posen, *The Sources of Military Doctrine* (Ithaca and London: Cornell University Press, 1984), pp. 13-14, 16-24.
2. *Ibid.*, pp. 14-15; Regarding NATO, see J. Blackwell, "Conventional Doctrine," in James E. Golden, Ara A. Clark, Bruce E. Arlinghaus (eds.): *Conventional Deterrence: Alternatives for European Defence* (Lexington, 1984), pp. 137-147.
3. Wilhelm Agrell, *Alliansfrihet och Atombomber* (Stockholm: Liber Förlag, 1985), pp. 19-24.
4. *Ibid.*, p. 24; Posen, *op. cit.*, pp. 13-14.
5. Samuel Huntington, "Conventional Deterrence and Conventional Retaliation in Europe", *International Security*, Winter 1983-84, vol.8, no.3 (Cambridge, 1983), pp. 34-42.
6. Christopher Donnelly, "The Development of Soviet Military Doctrine", *International Defence Review* 8/1982, p. 38.
7. Posen, *op. cit.*, pp. 13-16.
8. The model was introduced in Pertti Salminen: *Uuden aseteknologian vaikutus sotilaallisiin doktriineihin*, (Helsinki: War College, 1987), pp. 7-22 (in Finnish).
9. *Ibid.*
10. K. Killinen, *Kansainvälinen Politiikka 1* (Porvoo: WSOY, 1964), pp. 48-80 (in Finnish); Also Posen, *op. cit.*, p. 222.
11. See *e.g.* Salminen, *op. cit.*, pp. 15-18.
12. Raimo Väyrynen, "Valtion voimavarat," in Esko Antola, Unto Vesa, Raimo Väyrynen (eds.): *Kansainvälinen Politiikka. Tutkimus ja Käytäntö* (Porvoo: WSOY, 1984), pp. 65-69 (in Finnish).
13. See *e.g.* Salminen, *op. cit.*, pp. 21-22.
14. Rome Declaration on Peace and Cooperation. The Alliance's New Strategic Concept, North Atlantic Council, Rome, 7-8 November 1991.
15. *The Directory of Nuclear, Biological and Chemical Arms and Disarmament*, 1990.
16. For example, President Boris Yeltsin on 29 January 1992 in his response to President George Bush's State of the Union Address.
17. In the fall of 1991 it was decided that only the surface launched missiles of the Strategic Defence Initiative would be installed.
18. See *e.g.* J. Westman, "Sodan tekokuut ja tähtien sota," in Eva Isaksson (ed.): *Sota avaruudessa. Tarua vai uhka?*, Rauhankirjallisuuden Edistämisseura (Jyväskylä: Gummerus Oy, 1985), pp. 54-57 (in Finnish).
19. General Ross in his lecture of 27 January 1992 at the War College, Helsinki.
20. For more on the composition of the RRC see *e.g.* J.A. Meacham, "Tomorrow's NATO: Leaner, Swifter", *Defence and Diplomacy*, August/September 1991, pp. 19-20, and Field Marshall Sir Richard Vincent, "NATO's Multinational Rapid Reaction Force", *International Defence Review: Defence '92*, pp. 29-32.
21. Donnelly, *op.cit.*, p. 39; George E. Hudson, "Current Soviet Security Policy in Europe: Reactions to NATO Defence Strategy", in Golden, Clark, Arlinghaus (1984), p. 127; Yrjö Honkanen: "Neuvostoliiton sotilaallinen doktriini," in *Strategian käsikirja*, Sotatieteen Laitos (Helsinki: Valtion Painatuskeskus, 1983), pp. 167-169 (in Finnish).

22. Heinz Magenheimer, *Die Verteidigung Westeuropas* (Koblenz: Bernard & Graefe Verlag, 1986), p. 76. Compare Donnelly, *op. cit.*, p. 43, and Honkanen, *op. cit.*, pp. 167-169.
23. Honkanen, *ibid.*, pp. 167-169.
24. Hugh Faringdon, *Confrontation* (London and New York: Routledge & Kegan Paul, 1986), pp. 128-129; Magenheimer, *op. cit.*, pp. 76-77.
25. See *e.g.* Christy Campbell, *AirLand Battle, The US Army's Blueprint for the War of Tomorrow* (Twickenham: Hamlyn, 1986), pp. 130-132; Faringdon, *op. cit.*, p. 251; Golden et al., *op. cit.* pp. 128-129.
26. News broadcast on radio station Deutsche Welle, 27 January 1992.
27. President Yeltsin's address to the Russian Parliament in January 1992.
28. *Field Manual 100-5* (FM 100-5), US Department of the Army, Washington, 1982, pp. 1-1 - 1-5; Horst Afheldt, *Defensive Verteidigung* (Hamburg: Rowolt Taschenbuch Verlag GmbH, 1984), pp. 28-30.
29. European Security Study (ESECS I), *Strengthening Conventional Deterrence in Europe* (New York: St. Martin's Press, 1983), p. 203; Faringdon, *op. cit.*, p. 264.
30. Campbell, *op. cit.*, pp. 175-182.
31. The contents of the doctrine are examined in Faringdon, *op. cit.*, p. 205 and 259; Paul R. Lindner, "Considerations of a Conventional Defence of Central Europe" in Golden, Clark, Arlinghaus (1984), *op. cit.*, pp. 109-112; Magenheimer, *op. cit.*, pp. 14-16, 20-30, 56.
32. Pekka Visuri, *Keskieuroopan puolustuksen muutospaineet. Arvio NATO:n taisteluoppien vaihtoehdoista käydystä keskustelusta* (Helsinki: ARNEK A/1, 1984) (in Finnish).
33. Lindner, *op. cit.*, p. 112; Magenheimer, *op. cit.*, pp. 58-60; Visuri, *op. cit.*, pp. 12-15.
34. Magenheimer, *op. cit.*, pp. 60-62; Visuri, *op. cit.*, pp. 15-17.
35. Lindner., *op. cit.*, pp. 111-113; Blackwell, *op. cit.*, pp. 138-145.
36. Blackwell, *op. cit.*, p. 142; Michael R. Gordon, "Technology and NATO Defence: Weighing the Options", in Golden, Clark, Arlinghaus (1984) p. 149; Faringdon, *op. cit.*, p. 263; Juha Harjula, "Länsi-Euroopan uhkakuva ja sen ratkaisu 1980-luvulla", *Sotatieteen laitoksen julkaisusarja 1 no.14* (Helsinki: 1983), pp. 29-30 (in Finnish).
37. European Security Study, *Stärkung der konventionellen Abschreckung in Europa* (Baden-Baden: Nomos Verlagsgesellschaft, 1985), p. 81.
38. ESECS I, *op. cit.*, pp. 201-202.
39. *Ibid.*, pp. 201-202, 242-243.
40. *Ibid.*, p. 220.
41. *Ibid.*, p. 250; Lindner, *op. cit.*, p. 110; Gordon, *op.cit.*, p. 149.
42. Gordon, *op. cit.*, pp. 149-150, 158.
43. See note 13.
44. Pentagon announcement 30 January 1992, Voice of America. Interview with Gen. Colin Powell and Dr. James Blackwell, 31 January 1992.
45. Esko Nieminen, "Sotilaallinen doktriini," in *Strategian käsikirja, op. cit.*, pp. 151-152.

46. Report of the Parliamentary Advisory Board for Defence Policy on the operational and financial plan of the administration of the Defence Ministry for 1987-1991 (PPTK), Committee Report 1986:23, (Helsinki: Valtion Painatuskeskus,1986), pp. 9-11, 13.
47. *Tietoja Maanpuolustuksesta* (Helsinki: Gummerus Oy, 1984), pp. 78-79 (in Finnish).
48. Adm. Jan Klenberg, "The Military Doctrine of Finland," Statement at the Seminar on Military Doctrine, Vienna, 9 October2 1991.
49. Agrell, *op. cit.*, pp. 24-25.
50. Report of the Swedish Defence Committee, 1984.
51. *Ibid.*, pp. 11, 40-41. Also see "Inriktning av programplan för perioden 1987-1992," *DsFö* 1986:1, Försvarsdepartementet (Stockholm: Liber Förlag, 1986), pp. 1, 17.
52. J. Wickbom, "Hot, beredskap, värnplikt och freds-organisation", *Kungliga krigsvetenskapsakademiens handlingar och tidskrift* (KKHT), 3/1985, p. 100; S. Magnusson, "Försvar mot RPV och helikoptrar", *KKHT* 3/1985, pp. 170-172; Report of the Swedish Defence Committee, 1984.
53. Sture Ericson, "Svensk försvarplannering hösten 1990, Inträdesförande 901204 i riksdagen," after the defence planning committee FK 88 had failed, *KKHT* 6/1990, pp. 57-65.
54. Överbefälhavaren: "Slutligt underlag inför 1992 års försvarsbeslut", *PLANL* 483:61800, dated 14 June 1991.
55. *Ibid.*
56. Bericht des Bundesrates an die Bundesversammlung über die Sicherheitspolitik der Schweiz. Konzeption der Gesamtverteidigung, 27 June 1973.
57. See *e.g.*, Peter Marti, *Schweizer Armee 86* (Frauenfeld: Verlag Huber, 1986), p. 17.
58. Schweizerische Sicherheitspolitik im Wandel. Bericht 90 des Bundesrats an die Bundesversammlung über die Sicherheitspolitik der Schweiz vom 1 Oct. 1990.
59. *Ibid.*, pp. 35-36.
60. *Ibid.*, p. 48; Interview with Lt. Col. Heinz Häsler in *Jane's Defence Weekly*, 20 April 1991, p. 659.
61. Pekka Visuri, *Totaalisesta sodasta kriisinhallintaan. Puolustusperiaatteiden kehitys läntisessä Keski-Euroopassa ja Suomessa vuosina 1945-1985* (Helsinki: Otava, 1989), p. 158 (in Finnish).
62. See *e.g.* Horst Pleiner, "Aktuelle militärstrategische Entwicklung und mögliche Auswirkungen auf das Bundesheer der neunzige Jahre", *Österreichische Militärische Zeitschrift* 5/90, pp. 369-379.
63. Emil Spannocchi, Presentation to the Austrian Association of Foreign Policy in November, 1990.

DOCUMENTATION

DECISION ON THE NEW AIR FORCE INTERCEPTOR

The Government has today authorized the Ministry of Defence to sign a Letter of Intent with the Government of the United States to purchase McDonnell Douglas' F/A-18 aircraft for the Finnish Air Force. The procurement consists of 57 single-seaters and 7 trainers.

In addition, the Government authorized the Ministry of Defence to make an offset agreement with McDonnell Douglas Corporation. As a prerequisite for the purchase, Parliament has set full offset compensations from Finland corresponding to the foreign share.

The F/A-18 meets in the best way the requirements set on the new aircraft when considering performance and costs as well as our national requirements.

The technical and commercial evaluations that have taken almost three years included the following types: F-16C/D, F/A-18C/D, JAS 39 Gripen, Mirage 2000-5 and MiG-29. The suitability of all these aircraft was investigated and all candidates were found to be efficient in their role. The main differences were due to the acquisition and operating costs, the suitability of the aircraft in Finnish conditions according to the requirements set by the Air Force, and the security to carry out the aircraft development programs and the possibility to maintain the performance of the aircraft during its life-cycle of thirty (30) years.

The costs of the aircraft, first stage maintenance equipment and training as well as of the participation of Finnish industry will be covered by the granted procurement authorization of 9.5 billion marks. Based on the most recent offers, it has also been possible to define the additional expenses incurring later by the supplement of the maintenance and training system as well as the procurement of weapons. The costs will amount to some 3.5 billion marks during 1994-2001. The total procurement will thus amount to some 13 billion marks on the 1992 price level.

There are plans to sign the actual procurement agreement by mid-June. The first aircraft will be delivered in the latter half of 1995 and the last deliveries are scheduled for the year 2000.

Source: Ministry of Defence Bulletin, 6 May 1992

FINLAND'S FIGHTER CHOICE

by Air Force Commander-in-Chief Major General Heikki Nikunen

The Finnish Air Force's evaluation programme to renew the existing interceptor fleet was launched officially in 1989; before that it had, of course, been a part of long-term resource planning, and preliminary performance criteria had also been studied earlier.

The evaluation process was very thorough and comprehensive, and it was therefore characterized by a particularly tight and demanding timescale. The objective for decision-making was set to year 1992, so that taking into consideration a normal three years' delivery time, it would have been possible to establish a time- and volume-controlled renewal scheme effective from the year 1995 - when the first old aircraft will leave the service - onwards.

The evaluation included two test flight periods, the first being arranged in the potential delivery countries - where emphasis was placed on aircraft performance and flying characteristics -, whilst during the second phase, which took place in Finland, capabilities of radar and weapon systems against many complex target formations were assessed. Reliability, maintainability, training, support, industrial co-operation, offset arrangements and all commercial and cost-related questions were studied during the evaluation.

The evaluation and decision-making schedule was adhered to as planned at all levels, which enabled the Government to make a decision to authorize the Ministry of Defence to acquire 57 single-seat and 7 two-seat McDonnell Douglas F/A-18C/D Hornets. A letter of intent and a contract were signed on the 8th of May and 5th of June, 1992, respectively.

The choice of the aircraft type was based on a quality/cost ratio, the total performance being divided by total costs which include both purchase costs and life-cycle running costs. On the performance side, an air combat capability was the decisive factor, due to the Finnish Air Force's main mission as a fighter air arm.

After a tough evaluation during which computation material was used extensively it must be said that all other candidates, ie. the:

- General Dynamics F-16
- Dassault-Breguet Mirage 2000-5

- Saab 39 Gripen, and
- Mikoyan MiG-29

were good and capable fighters. Without going into confidential details it can be stated that, for example, the F-16 and the MiG-29 both possess really good flight performance, while electronics and system solutions employed in the Mirage and the Gripen are quite nice. All in all, however, the F/A-18 covered the whole spectrum in a winning way, and its quality/cost ratio was clearly superior. Also, the F/A-18's growth potential was the best from the Finnish Air Force's standpoint. The age of the design is optimal, and taking into consideration the development potential of the entire user family and the interest of the type's main user, the F/A-18 offers the best up-to-date programme opportunity with smallest costs during a long life-cycle.

A wide industrial base of the McDonnell Douglas company gives a proper mix for many sorts of offset programmes.

The motto of the Finnish Air Force is *Qualitas Potentia Nostra*. Taking into account the decisive strategic importance that an ability to control an airspace has these days, and future security policy, air defence is the first and the most critical factor in the building-up of a pre-emptive capability. With the new F/A-18 system the Finnish Air Force can fulfil its main mission, which is to keep Finland's airspace outside any crisis, literally according to its motto.

1 *Evolution of the Finnish Military Doctrine 1945-1985,*
Pekka Visuri, 1990.

2 *Flank or Front: An Assessment of Military – Political Developments in the High North.*
Tauno Nieminen, 1991.

3 *Non Offensive Defence: A Criteria Model of Military Credibility,*
Arto Nokkala, 1991.

4 *Development of military technology and its impact on the Finnish land warfare doctrine.*
Markku Koli, 1992.